Appendix 1.1.E - Willingness to pay research 2 - Accent

Wessex Water

September 2018

Wessex Water
YTL GROUP

Business plan section	Supporting document
Board vision and executive summary	
1 Engaging customers	**1.1 Summary of research findings**
	1.2 Communications strategy
	1.3 Customer participation and behavioural engagement strategy
2 Addressing affordability and vulnerability	
3 Delivering outcomes for customers	
4 Securing long term resilience	
5 Markets & innovation: wholesale	
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Wessex Water
Further Willingness to Pay Research

Final Report
November 2017

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EXECUTIVE SUMMARY

Introduction

Accent and PJM Economics are conducting a second phase of willingness to pay (WTP) research for Wessex Water (WW) in order better to understand customers' preferences and WTP for water and wastewater service improvements. This is our final report for the study. It contains details of the survey design and development, the survey administration, findings on customers' WTP and our conclusions.

Survey Design and Development

The survey questionnaire was designed to obtain customer valuations of water and sewerage service measure changes via a series of discrete choice experiments (DCE). In this respect, the design was similar to the questionnaires used for WW at PR14 and followed UKWIR (2011) guidelines[1].

However, a key difference from WW's PR14 survey was that water and sewerage service measures were combined into a single survey instrument rather than being included in separate surveys by service area. A combined water and sewerage service questionnaire is more desirable, in general, because separate surveys can lead to the so-called 'adding up' issue whereby the sum of two separate values can exceed valuations obtained for a combined package.

The survey was composed of three lower level choice exercises and a Package exercise. The lower level exercises comprised the following service measures, where these were agreed with WW:

Exercise 1
- Unexpected supply interruptions (3+ hours)
- Planned supply interruptions (3+ hours)
- Long term outage – chance of being without water (12 hrs to 2 weeks)
- Discolouration (few hours)
- Taste and odour not ideal (few days)

Exercise 2
- Temporary use ban (May to September)
- Water leakage
- Pipe bursts
- Sewer flooding inside property
- Sewer flooding in gardens/close to other properties

Exercise 3
- Pollution incidents
- River miles of 'less than good' quality (out of total of 2429 miles)

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[1] UKWIR (2011) Carrying Out Willingness to Pay Surveys, Report Ref. 11/RG/07/22

- Bathing waters of 'less than good quality'

A Package exercise was included after the three lower level exercises. This exercise was used to derive WTP values for improvements in all of the service measures of each lower level exercise in the context of a complete package of water and sewerage service measures.

In the lower level exercises, the service level for each measure in each alternative was either at its current, or status quo (SQ) level, a decrement level (-1), an intermediate improvement level (+1), or at a stretch target improvement level (+2). These levels were all set by WW.

Also included in the lower level games was a measure representing the change in the customer's annual bill from WW. Bill levels for each option in the lower level exercises were selected from the range {-£20, £0, £20, £40}.

For the Package exercise, only two service levels were included for each block of service measures, where these were chosen to span the full range of service change captured by the lower level exercise, i.e. the '-1' and the '+2' level.

Bill levels for the Package exercise were selected from the range {-£30, £0, £30, £60}.

The survey was pre-tested with WW's customers via a pilot phase in which 87 households were interviewed online.

Survey Administration

The main stage comprised 511 online interviews with dual-service household customers. The data were weighted to be representative of the customer base by age, gender and SEG.

Key Findings

Our main results on WTP were derived from an econometric analysis of the lower level and Package exercise choice responses. This analysis is reported in detail in Appendix B.

A key finding from our econometric analysis was that respondents appeared to be opposed to bill reductions, on average, to the extent that they would seemingly prefer any marginal improvement in service, or avoided deterioration, in preference to bill reductions. This finding implies that bill reductions would not be valued by customers and, as such, service deteriorations would also not be desired on average, regardless of the size of the bill reduction that could be achieved. Similar findings were observed in the previous phase of WTP research undertaken for WW.

Our main results on WTP for service level changes are presented in Table 1 below, sorted from the largest to the lowest value. The 'SQ to +1' results show that improvements to river water quality were valued the highest, followed by long-term outage, unexpected supply interruptions and sewer flooding in gardens and close to other properties.

Improvements to discoloration, water leakage, planned supply interruptions and temporary use bans were valued the least.

Total WTP for the full 'SQ to +1' improvement in all services was valued at £13.17/hh/yr, while the +1 to +2 was valued at £19.14/hh/yr. The reason why +1 to +2 WTP exceeded SQ to +1 was mainly because the relative service improvements included in the former were on average substantially larger than in the latter.

The overall total of £13.17 per year for an intermediate improvement package represents a decrease in relation to the previous phase of WTP research for WW. However, total WTP for the stretch '+2' improvement package was similar across phases, with a value of £32.31 in the present study, compared to £36.74 in the previous phase.

Amongst the service improvements offered in the intermediate 'SQ to +1' package, the improvements to river water quality and long-term outages were estimated to have the highest value, while improvements to leakage and discolouration measures were found to have the lowest value.

Conclusions and Recommendations

Overall, the valuation estimates presented can be considered to be meaningful measures of WW customers' values for the range of services, and service levels, contained within the survey. As such, we recommend them as a key source of evidence for use within the triangulation exercise that WW intends to conduct to assimilate findings from a wide range of sources for PR19 business planning.

Confidence in the results reported here can be gained from the following:

- The design of the questionnaire was fully tested via a pilot test with households and businesses.

- A clear majority of responses were assessed as valid, taking into account respondents' feedback

WTP varied plausibly across customer segments and with respect to attitudes to the current bill.

Table 1. WTP Values for Service Improvements by Service Measure

| Service measure | Unit | Levels | | | WTP (£/hh/yr) | | | | | |
| | | | | | SQ to +1 | | | +1 to +2 | | |
		SQ	+1	+2	Mean	Lower	Upper	Mean	Lower	Upper
River miles of 'less than good' quality (out of total of 2429 miles)	Miles	600	370	0	**£4.28**	£3.23	£5.33	**£6.89**	£5.20	£8.58
Long term outage – chance of being without water (12 hrs to 2 weeks)	Nr. of properties	80	40	10	**£1.83**	£1.29	£2.37	**£1.37**	£0.97	£1.77
Unexpected supply interruptions (3+ hours)	Nr. of properties	9,000	8,000	7,000	**£1.15**	£0.82	£1.49	**£1.15**	£0.82	£1.49
Sewer flooding in gardens/close to other properties	Nr. of properties	3,700	3,330	2,780	**£1.10**	£0.57	£1.63	**£1.64**	£0.85	£2.43
Pollution Incidents	Nr. Cat. 1/2/3 incidents/year	70	63	53	**£1.04**	£0.79	£1.30	**£1.49**	£1.12	£1.85
Sewer flooding inside property	Nr. of properties	180	160	140	**£0.93**	£0.48	£1.38	**£0.93**	£0.48	£1.38
Bathing waters of 'less than good quality'	%	4%	3%	0%	**£0.78**	£0.59	£0.97	**£2.33**	£1.76	£2.91
Pipe bursts	Nr. of bursts	1,800	1,620	1,440	**£0.69**	£0.36	£1.02	**£0.69**	£0.36	£1.02
Taste and odour (few days)	Nr. of properties	1,500	1,350	900	**£0.58**	£0.41	£0.76	**£1.75**	£1.24	£2.27
Temporary use ban (May to September)	Nr. of properties	1 in 100	1 in 200	1 in 500	**£0.27**	£0.14	£0.40	**£0.16**	£0.08	£0.24
Planned supply interruptions (3+ hours)	Nr. of properties	15,000	9,000	3,000	**£0.26**	£0.18	£0.33	**£0.26**	£0.18	£0.33
Water leakage	%	21%	20%	19%	**£0.15**	£0.08	£0.22	**£0.15**	£0.08	£0.22
Discolouration (few hours)	Nr. of properties	6,500	5,850	3,900	**£0.11**	£0.08	£0.14	**£0.32**	£0.23	£0.42
Total					*£13.17*			*£19.14*		

Lower and Upper values represent the bounds of the 95% confidence interval

1   INTRODUCTION

1.1 Background

Accent and PJM Economics are conducting a second phase of willingness to pay (WTP) research for Wessex Water (WW) in order better to understand customers' preferences and WTP for water and wastewater service improvements.

Accent has designed an instrument for a primary stated preference study following discussions with WW. This survey instrument follows closely the approach adopted for PR14 (the discrete choice experiment (DCE) survey hereafter) and also tested in the pilot survey conducted for PR19 alongside the novel PR19-style approach previously reported.

The main stage sample was 511 dual-service household participants.

1.2 Objectives

This document is the final report for this study. It summarises the survey instrument, our pre-testing methodology and key findings from our econometric model and WTP estimations.

1.3 Structure of the Report

The remainder of this report is structured as follows. Section 2 describes the survey designs; Section 3 describes the survey administration; Section 4 contains findings on customers' attitudes and experiences, including participants' feedback on various aspects of the questionnaire; Section 5 contains our main valuation results; Section 6 draws conclusions and recommendations. Appendix A contains the questionnaire used in the survey; and Appendix B contains a detailed report on the econometric analysis undertaken to derive our main valuation results.

2 SURVEY DESIGN AND DEVELOPMENT

2.1 Questionnaire Design

The survey questionnaire was designed to obtain customer valuations of water and sewerage service measure changes via a series of DCEs. In this respect, the design was similar to the questionnaires used for WW at PR14, and followed UKWIR (2011) guidelines.

DCE questions offer respondents a series of choices between two or more alternative packages of service levels. The questions require the respondent to make a trade-off, with some service measures better in one alternative and some better in the other. In comparison with more traditional and well-known methods of market research, such as importance ratings and proposition agreement scales, DCE methods have the advantage that they are explicitly theoretically consistent with the use of CBA as a means of decision making. The choices made by the respondents indicate how they value each of the service measures in relation to one another, in accordance with established principles of random utility theory[2].

A key difference from WW's PR14 survey was that water and sewerage service measures were combined into a single survey instrument rather than being included in separate surveys by service. A combined water and sewerage service questionnaire is more desirable, in general, because separate surveys can lead to the so-called 'adding up' issue whereby the sum of two separate values can exceed valuations obtained for a combined package.

2.2 Service Measures

One of the key first tasks in the development of the research was to select and define the service measures to be valued. The service measure selection was based on WW's service valuation framework, and informed by Ofwat's PR19 methodology which set out a number of common performance commitments (PC) on which companies were to engage with their customers.

The final set of service measures used in this survey, along with their show card descriptions, are shown in Table 2. The selection, definition and descriptions were all as agreed with WW.

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[2] See for example Train, K. (2003) "Discrete Choice Methods with Simulation", Cambridge University Press.

Table 2: Service Measures - Definitions and Descriptions

Attribute	Description
UNEXPECTED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent. The water supply at your property can be interrupted due to burst pipes, which can happen at any time. When an unexpected interruption occurs, properties are affected for five and a half hours on average. 90% of interruptions are less than 12 hours. Currently the number of properties affected by this in the Wessex Water area in any year is around 9,000 (1.5% of total). That's out of a total of 590,000 water properties.
PLANNED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent. The water supply at your property can be interrupted due to planned maintenance, in which case you would be given at least 48 hours' notice. When a planned interruption occurs, properties are affected for four and a half hours on average. 100% of interruptions are less than 12 hours. Currently the number of properties affected by this in the Wessex Water area in any year is around 15,000 (2.5% of total). That's out of a total of 590,000 water properties.
LONG-LASTING SUPPLY STOPPAGE 12 hours to 2 weeks	A long-lasting stoppage to the water supply at your property lasting from 12 hours to 2 weeks. Currently the number of properties affected by this in the Wessex Water area in any year is around 80 (0.014% of total). That's out of a total of 590,000 water properties.
DISCOLOURED WATER at your property for a few hours.	On rare occasions, your water may be discoloured because of harmless deposits that accumulate over time in water mains, but the water is safe to drink. We wouldn't expect anyone to drink it when it looks unpleasant. Even if you run your tap for several minutes, the water would still be brown/discoloured. This would typically last for a few hours at a time. Currently 6,500 properties (1.1% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 590,000 water properties.
NON IDEAL TASTE AND SMELL OF YOUR TAP WATER	Water taste and smell can be less than ideal at your property for a few days at a time because of dissolved minerals and gases, but the water is safe to drink. Currently 1,500 properties (0.25% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 590,000 water properties.
HOSEPIPE BAN (FROM MAY TO SEPTEMBER)	As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one. Currently, the chance that this happens to a property in the Wessex Water area in any year is around 1 in 100. An alternative way of explaining this is that there is a 12% chance that your property will experience this problem over the course of Wessex Water's 25 year plan.

Attribute	Description
WATER LEAKAGE	Water can leak from Wessex Water's extensive network of pipes. Wessex Water can proactively detect and repair leaks, and replace or refurbish sections of pipework to reduce the extent of leakage. Currently 21% of the water that is treated by Wessex Water gets lost due to leakage.
PIPE BURST	Burst pipes on our extensive network can occur due to damage from ground movement after frosts, traffic or due to the age of the pipes. Currently Wessex Water have 1,800 bursts per year.
SEWER FLOODING INSIDE YOUR PROPERTY	Flooding from the sewer gets inside properties, causing damage to property. When this happens, substantial clean up and repair of flooring and walls may be needed Currently 180 properties (0.03% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 1,200,000 wastewater properties.
SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY	Flooding from the sewer gets close to people's properties, or gets into their gardens. Currently 3,700 properties (0.63% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 1,200,000 wastewater properties.
POLLUTION INCIDENTS resulting from overflows within the sewerage network	Overflows or bursts within the public sewerage network can occasionally affect the quality of rivers and coastal bathing waters and beaches. There are currently around 70 incidents per year.
RIVER WATER QUALITY	Currently, around 600 miles of river out of a total of 2,429 in the Wessex Water wastewater area (25% of total) is classified as 'less than good'. This means that animal and plant life is affected (eg some species may be missing) and there may be some pollution or murky water
BATHING WATER QUALITY	The cleanliness and quality of coastal bathing water and beaches in your area is classified according to the chances of getting an infection such as an upset stomach, an ear infection or a sore throat after bathing in the sea. Currently, 4% of bathing waters in the Wessex Water wastewater area are classified as 'less than good'. This means that 8 or more people out of 100 have a chance of getting an infection after bathing in them.

2.3 Stated Preference Formats

The survey was composed of three lower level exercises and a Package exercise. The lower level exercises were as follows:

Exercise 1
- Unexpected supply interruptions (3+ hours)
- Planned supply interruptions (3+ hours)
- Long term outage – chance of being without water (12 hrs to 2 weeks)
- Discolouration (few hours)
- Taste and odour not ideal (few days)

Exercise 2
- Temporary use ban (May to September)
- Water leakage
- Pipe bursts
- Sewer flooding inside property
- Sewer flooding outside property

Exercise 3
- Pollution incidents
- River miles of 'less than good' quality (out of total of 2429 miles)
- Bathing waters of 'less than good quality'

Each choice question offered the respondent two alternative packages of service levels.

The choice questions all required the respondent to make a trade-off, with some service measures better in one alternative and some better in the other. The choices made by the respondents were treated as indicating how he/she valued the service measures in relation to one another, in accordance with established principles of random utility theory. Example choice cards from lower level exercise 1, 2 and 3 can be found in Figure 1, Figure 2 and Figure 3 respectively.

Figure 1: Example Choice Card from Exercise 1

In the first set of options, the service levels in Option A would mean an associated bill decrease of £20 by 2024, and in Option B there would be an associated bill increase of £20 by 2024.
Which option do you prefer?

	The number of properties affected in the Wessex Water area in any one year	
	PACKAGE A	**PACKAGE B**
UNEXPECTED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	7,000 properties	11,500 properties
PLANNED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	3,000 properties	19,000 properties
LONG-LASTING SUPPLY STOPPAGE 12 hours to 2 weeks	80 properties	10 properties
DISCOLOURED WATER at your property for a few hours	3,900 properties	6,500 properties
NON IDEAL TASTE AND SMELL OF YOUR TAP WATER	1,740 properties	900 properties
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	Decrease of £20 by 2024 *Gradual decrease of £4 every year between 2019 and 2024*	Increase of £20 by 2024 *Gradual increase of £4 every year between 2019 and 2024*
	A ✓	B ○

Figure 2: Example Choice Card from Exercise 2

In the first set of options, the service levels in Option A would mean an associated bill decrease of £20 by 2024, and in Option B there would be an associated bill increase of £20 by 2024.
Which package do you prefer?

	PACKAGE A	PACKAGE B
HOSEPIPE BAN (FROM MAY TO SEPTEMBER) *The chance that this happens at your property in any one year is*	*1 in 500*	*1 in 50*
WATER LEAKAGE *The proportion of water that is treated and lost due to leakage*	*19%*	*22%*
PIPE BURST *The number of pipe bursts in the Wessex Water are in any one year is*	*1,800 bursts*	*1,440 bursts*
SEWER FLOODING INSIDE YOUR PROPERTY *The number of properties affected in the Wessex Water area in any one year is*	*140 properties*	*180 properties*
SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY *The number of properties affected in the Wessex Water area by this in any one year is*	*4,070 properties*	*2,780 properties*
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	Decrease of £20 by 2020 *Gradual decrease of £4 every year between 2019 and 2024*	Increase of £20 by 2024 *Gradual increase of £4 every year between 2019 and 2024*
	A ✔	B ◯

Figure 3: Example Choice Card from Exercise 3

In the first set of options, the service levels in Option A would mean an associated bill decrease of £20 by 2024, and in Option B there would be an associated bill increase of £40 by 2024.
Which package do you prefer?

	PACKAGE A	PACKAGE B
POLLUTION INCIDENTS resulting from overflows within the sewerage network *The number of pollution incidents in the region in any one year is*	*53 incidents*	*88 incidents*
RIVER WATER QUALITY *Miles of river at less than good status (out of 2,429 miles in total) in any one year*	*990 miles*	*0 miles*
BATHING WATER QUALITY *Percentage of beaches at less than good status (out of 47 beaches in total) in any one year*	*6%*	*0%*
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	Decrease of £20 by 2020 *Gradual decrease of £4 every year between 2019 and 2024*	Increase of £40 by 2024 *Gradual increase of £8 every year between 2019 and 2024*
	A ✔	B ◯

A Package exercise was included after the three lower level exercises. It contained all the service measures shown, but where the measures from each lower level exercise was treated as a single combined service measure. This meant that there were effectively three service measures that varied between options and across choice situations: (i) Exercise 1 services, (ii) Exercise 2 services and (iii) Exercise 3 services. The Package exercise was included to understand the relative worth of each lower level block of service measure changes as a whole. Also included in the Package exercise was a service measure representing the customer's annual bill from WW.

Examples of the discrete choice experiment survey Package exercises for the water and sewerage surveys can be found in Figure 4.

Inclusion of the bill attribute allowed us to obtain estimates of WTP for improvements or decrements to each of the service measure blocks as a whole. This WTP value could then be split between the individual service measures making up the service block using the choice data from the lower level experiments to obtain values for unit improvements or decrements to service levels for each service measure.

Figure 4: Example Package Exercise Choice Card

In the first set of options, the service levels in Option A would mean an associated bill increase of £60 by 2024, and in Option B there would be an associated bill decrease of £30 by 2024.
Which option do you prefer?

		PACKAGE A	PACKAGE B
GAME 1	UNEXPECTED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	11,500 properties	7,000 properties
	PLANNED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	19,000 properties	3,000 properties
	LONG-LASTING SUPPLY STOPPAGE 12 hours to 2 weeks	160 properties	10 properties
	DISCOLOURED WATER at your property for a few hours	7,560 properties	3,900 properties
	NON IDEAL TASTE AND SMELL OF YOUR TAP WATER	1,740 properties	900 properties
GAME 2	HOSEPIPE BAN (FROM MAY TO SEPTEMBER)	1 in 500	1 in 50
	WATER LEAKAGE	19%	22%
	PIPE BURST	1,440 bursts	1,980 bursts
	SEWER FLOODING INSIDE YOUR PROPERTY	140 properties	200 properties
	SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY	2,780 properties	4,070 properties
GAME 3	POLLUTION INCIDENTS resulting from overflows within the sewerage network	88 incidents	53 incidents
	LESS THAN GOOD RIVER WATER QUALITY (out of 2,429 miles of river in total)	990 miles	0 miles
	LESS THAN GOOD BATHING WATER QUALITY (out of 47 beaches)	6%	0%
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above		Increase of £60 by 2024 *Gradual increase of £12 every year between 2019 and 2024*	Decrease of £30 by 2024 *Gradual decrease of £6 every year between 2019 and 2024*

A ◯   B ◯

2.4 Attribute Levels

In the lower level exercise, the service level for each measure in each alternative was either at its current, or status quo (SQ) level, a decrement level (-1), an intermediate improvement level (+1), or at a stretch target improvement level (+2). These levels were all set by WW.

Also included in the lower level exercises was a measure representing the change in the customer's annual bill from WW. Bill levels for each option in the lower level exercises were selected from the range {-£20, £0, £20, £40}.

For the Package exercise, only two service levels were included for each block of service measures, where these were chosen to span the full range of service change captured by the lower level exercise, i.e. the '-1' and the '+2' level.

Bill levels for the Package exercise were selected from the range {-£30, £0, £30, £60}.

2.5 Experimental Design

The experimental designs for each of the exercises were generated using an algorithm which sought to maximise the statistical precision of the estimates, whilst avoiding choice pairs where one option dominated the other one (i.e. was better on all service aspects). For each of the lower level exercises as well as the Package exercise, a total of 30 choice cards were generated and grouped in 6 blocks of 5 cards each. Each respondent was administered choice cards from a randomly selected block for each exercise, hence answering 20 choice cards in total.

2.6 Pilot Testing

A pilot survey of 87 interviews was conducted in order to test:

- the recruitment process
- the clarity and flow of the questionnaire
- the appropriateness of the language used
- the accuracy of all routings
- ease of use of the show material
- the stated preference design and understanding of the stated preference exercises
- the interview duration
- the survey hit rate.

Accent assessed the performance of the survey instrument by analysing feedback from interviewers and from the participants themselves, and by inspection of econometric models estimated on the pilot data.

The pilot analysis suggested that the survey instrument was in general working well and yielding plausible model and WTP estimates. Participants' feedback showed that the majority felt that they were able to make comparisons between the options presented them, found each of the levels of service described to them easy to understand and did not feel that service levels were so low or high that they were implausible.

As for the econometric results, results were broadly encouraging. However, one coefficient in each of the lower level exercise models was estimated with a counter-intuitive sign, albeit all statistically insignificant at the 10% level. This was judged to be likely due to an insufficient sample size. We therefore completed a further analysis of interim data after a few days of the main fieldwork period, at which point the models were all performing satisfactorily with correct signs on all coefficients. A report on the pilot is available on request.

3 SURVEY ADMINISTRATION

3.1 Survey Mode and Sample Size

An online method was employed using sample provided by WW.

The main stage survey comprised a total of 511 online interviews with dual-service household customers.

3.2 Recruitment Method

Because of a low response rate in the pilot (2%) the main stage was incentivised. Each participant was offered a choice of a £5 Amazon or M&S voucher or for that amount to be donated to WaterAid charity.

Invitations were initially sent on Wednesday 18th October to 1,500 customers initially so that interim analysis could be undertaken on the first 100 interviews. An example of the email is shown below. The completion date was set as Wednesday 25th October.
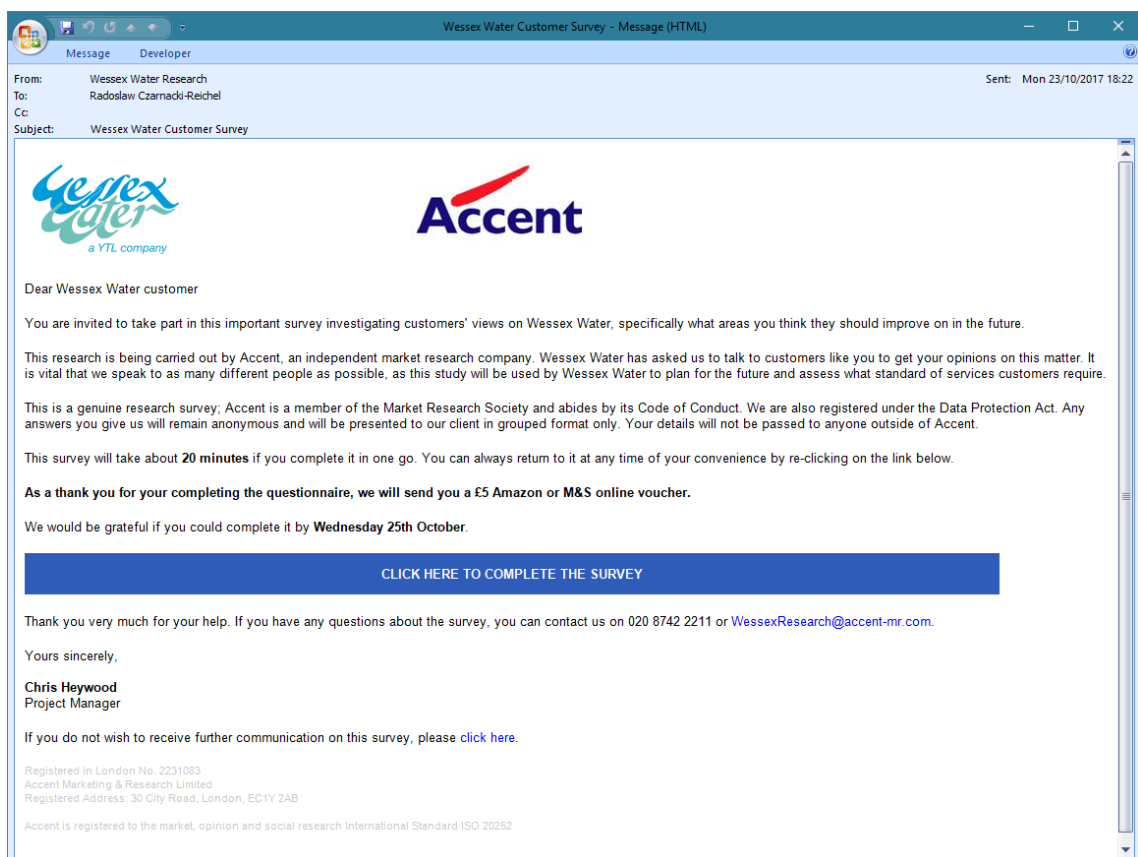
The remaining 6,250 invitations were sent out on Monday 23rd October. Reminder emails were sent all those who had not responded.

The 511 completed interviews represents an overall response rate of 7%.

3.3 Drop Out and Screen Out Analysis

Out of the 7,750 invitations sent, 725 (9%) were undeliverable due to the email address not being recognised.

In total, 1,074 (14%) entered the survey. Table 3 shows the breakdown of those who entered the survey but did not complete. This includes those who were screened out due to their answers and those who stopped filling in the survey after opening the link. The largest number of drop outs occurred at the beginning of the first SP exercise.

Table 3: Online Survey Drop Outs

Where stopped filling in the survey	N	%
Introduction screen	212	20
Screening section		
Q1: Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry?	30	3
Q3: Does your property have a septic tank or cess pit?	11	1
Q4-Q7 Postcode check questions	137	13
Q10: Do you currently have any on-going complaints or issues with Wessex Water?	2	*
Q12: How would you describe the occupation type of the chief income earner in your household?	2	*
Q15: What was your age at your last birthday?	5	*
Q17: Do you have a water meter?	18	2
Q20: Do you practice any of the following leisure activities?"	11	1
SP Choice exercise 1		
Q23:SP1 Introduction and 1st choice set	53	5
Q24 SP1 2nd choice set	6	*
Q25 SP1 3rd choice set	10	1
Q26 SP1 4th choice set	13	1
Q27 SP1 5th choice set	6	*
SP Choice exercise 2		
Q28 SP2 1st choice set	16	1
Q29 SP2 2nd choice set	2	*
Q31 SP2 4th choice set	3	*
Q32 SP2 5th choice set	1	*
SP Choice exercise 3		
Q33 SP3 1st choice set	5	*
Q35 SP2 3rd choice set	1	*
SP Choice exercise 4		
Q38 SP4 1st choice set	6	*
Q39 SP4 2nd choice set	1	*
Q40 SP4 3rd choice set	1	*
Q42 SP4 5th choice set	2	*
Follow-up questions		
Q43: Did you generally feel able to make comparisons between the options…?	1	*
Q45: Did you find each of the levels of service we described easy to understand?	3	*
Q47: Were any of the service levels so low or so high that they were implausible?	1	*
Classification section		
Q49: What is your employment status?	2	*
Q53. And finally, what type of property do you live in?	1	*
Completes	**511**	**48**
Base	**1074**	**100**

* = less than 0.5%

3.4 Interview Length

The average interview length was 18 minutes.

3.5 Sample Characteristics

The breakdown of online household interviews by key characteristics is shown in Table 4 below.

Table 4: Breakdown of Household Pilot Interviews by Key Indicators (unweighted)

Characteristic	Value	N
Gender	Male	52
	Female	46
	Refused	3
Age	18-24	3
	25-34	22
	35-44	18
	45-54	17
	55-64	12
	65-74	15
	75+	3
	Refused	10
SEG	AB	56
	C1C2	28
	DE	11
	Not stated	5
Water Meter Status	Water meter	67
	No water meter	28
	Don't know	5
Total		**511**

Table 5 shows the breakdown of household interviews by working status, highest level of qualifications, benefits and property type.

Table 5: Breakdown of Household Interviews by Other Indicators (unweighted)

Characteristic	Value	N
Working status	Working full-time (30+ hours a week)	53
	Working part-time (8-29 hours a week)	12
	Not working – looking for work	1
	Not working – not looking for work	1
	Full-time student	2
	Part-time student	0
	Retired	19
	Retired unpaid voluntary work	4
	Looking after family/home	3
	Other	2
	Refused	3
Highest level of qualifications[3]	No qualifications	3
	Level 1	7
	Level 2	14
	Apprenticeship	2
	Level 3	18
	Level 4 and above	51
	Other qualifications	4
Benefits	Attendance allowance	0
	Carer's allowance	2
	Child tax credit	8
	Council tax benefit	6
	Disability living allowance	4
	Housing benefit	7
	Income support (or similar)	1
	Jobseeker's allowance	0
	Pension credit	1
	Universal credit	1
	Working tax credit	6
	None of these	78
	Refused	6
Property type	Flat	19
	Terraced house	20
	Semi-detached house	24
	Detached house	23
	Bungalow	12
	Refused	2
Total		**511**

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[3] **Level 1:** 1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills;
Level 2: 5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma;
Level 3: 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma;
Level 4 and above: Degree (for example BA, BSc), Higher Degree (for example MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (for example teaching, nursing, accountancy);
Other qualifications: Vocational/Work-related Qualifications, Foreign Qualifications (not stated/level unknown)

3.6 Weighting

The target and achieved sample profiles were as shown in Table 6. To correct for the divergences between the population target profile and the achieved sample proportions, we performed iterative proportional fitting, or raking, to produce a set of calibrated survey weights such that the sample weighted totals of control variables matched the known population totals. In cases where participants refused to answer the age, gender or (contributory) SEG questions, these were included in the sample with a weight of 1.0.

Table 6. Target and Achieved Household Sample Profiles

Demographic	Target (WW Dual-service customers)	Achieved[1]
SEG		
AB	27%	59%
C1	29%	18%
C2	22%	12%
DE	22%	11%
Age		
18-34	16%	28%
35-54	35%	39%
55+	49%	34%
Gender		
Male	49%	53%
Female	51%	47%

(1) Refused responses have been excluded from these proportions. These participants were included in the sample with a weight of 1.0.

All results presented in the remainder of this report are based on weighted data, except where indicated.

4 ATTITUDES AND EXPERIENCES

This section includes findings from the survey on a number of background questions asked prior to the SP exercises, plus respondents' feedback following the SP questions.

4.1 Use of the Water Environment

Figure 5 presents findings on customers' use of the water environment by type of activity. The most popular activity was visiting beaches and/or river banks, followed by swimming/paddling in the sea/rivers. Only a minority of respondents said 'None'.

Figure 5: Use of the Water Environment by Activity
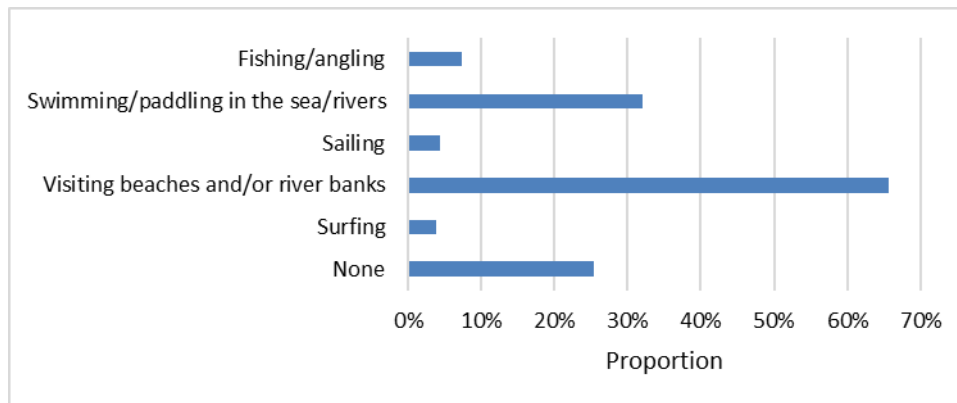
Base: 511 (weighted)

4.2 How Well Informed About the Environment

Figure 6 shows that respondents were most likely to say they were 'Informed' or 'Neither uninformed nor informed' when asked how informed they felt about the quality of the environment.

Figure 6: How Informed Do Respondents Feel about the Environment?
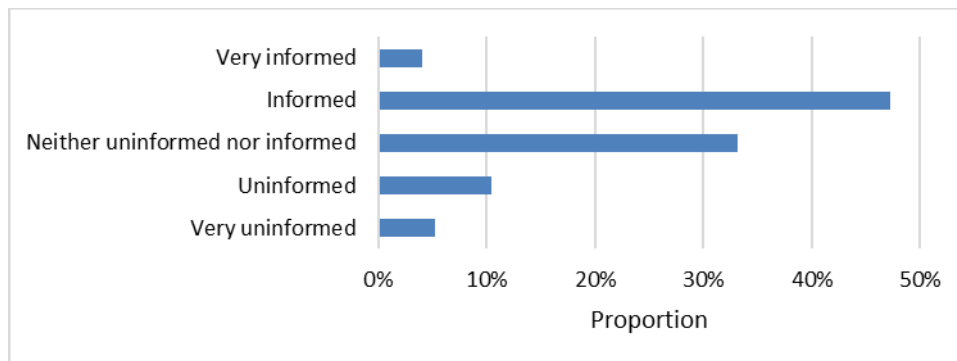
Base: 511 (weighted)

4.3 Attitudes to the Bill

Figure 7shows that the majority of people said that the amount they pay Wessex Water for their water and sewerage services was 'About right'. However, almost half said that the amount was either 'Slightly too much' or 'Far toom much'.

Figure 7: How Do Respondents Feel about the Amount They Pay Wessex Water?
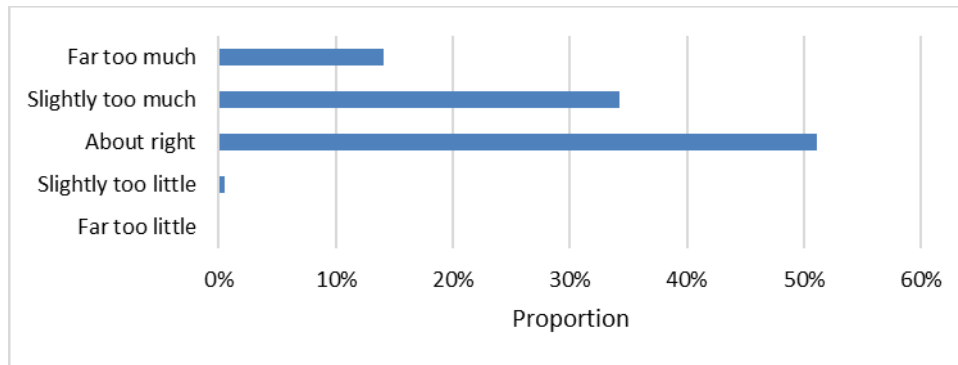
Base: 511 (weighted)

4.4 Respondent Feedback

Table 7 summarises various statistics concerning respondents' feedback to the SP surveys. In brief, more than three quarters of the sample felt that they were able to make comparisons between the options presented them, and more than three quarters found each of the levels of service described to them easy to understand. Moreover, less than a fifth of the sample felt that service levels were so low or so high that they were implausible.

Overall, this respondents' feedback gives us confidence that the exercises were well understood.

Table 7: Respondent Feedback to SP Exercises

| Question	Percent Yes
Did you generally feel able to make comparisons between the options presented to you?	77%
Did you find each of the levels of service we described easy to understand?	79%
Were any of the service levels so low or so high that they were implausible?	18%

Base: 511 (unweighted)

Our main results in the next section are based on the full sample of responses. However, we also report a sensitivity analysis based on the restricted sample of respondents who answered 'Yes' to the question 'Did you generally feel able to make comparisons between the options presented to you?'.

Survey Enjoyment

Household participants were asked to rate their enjoyment in completing the survey using a scale of 1 to 10 where 1 means 'low enjoyment' and 10 means 'high enjoyment'.

The mean enjoyment rating was 4.7. See Figure 8 for the distribution of responses.

Figure 8: Household Survey Enjoyment
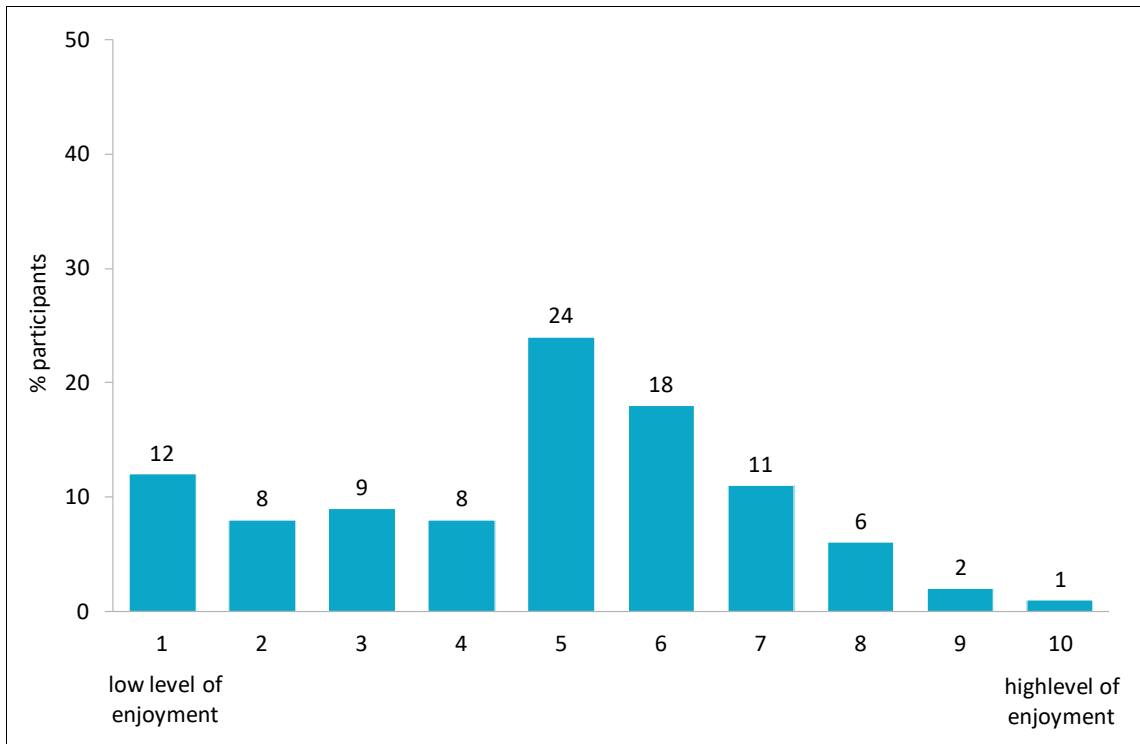
Base: 511 (unweighted)

5   MAIN VALUATION RESULTS

5.1   Introduction

Our main results on WTP were derived from an econometric analysis of the lower level and Package exercise choice responses. This analysis is reported in detail in Appendix B.

A key finding from our econometric analysis was that respondents appeared to be opposed to bill reductions, on average, to the extent that they would seemingly prefer any marginal improvement in service, or avoided deterioration, in preference to bill reductions. This finding implies that bill reductions would not be valued by customers and, as such, service deteriorations would also not be desired on average, regardless of the size of the bill reduction that could be achieved. Similar findings were observed in the previous phase of WTP research undertaken for WW.

In the remainder of this section we present findings on WTP for service level improvements (e.g. 'SQ to +1'), valuations per unit of service change (e.g. per avoided interruption), results on how WTP varies over customer segments, a sensitivity analysis of how WTP varies with respect to different approaches for excluding respondents who reported difficulties making choices in the SP questions, and an analysis of the sensitivity of WTP to attitudes to the current bill.

5.2   Willingness to Pay for Service Level Changes

Our main results on WTP for service level changes are presented in Table 8 below, sorted from the largest to the lowest value. The 'SQ to +1' results show that improvements to river water quality were valued the highest, followed by long-term outage, unexpected supply interruptions and sewer flooding in gardens and close to other properties. Improvements to discoloration, water leakage, planned supply interruptions and temporary use bans were valued the least.

Total WTP for the full 'SQ to +1' improvement in all services was valued at £13.17/hh/yr, while the +1 to +2 was valued at £19.14/hh/yr. The reason why +1 to +2 WTP exceeds SQ to +1 is mainly because the relative service improvements included in the former were on average substantially larger than in the latter.

The value of £13.17 per year for an intermediate improvement package represents a decrease in relation to the previous phase of WTP research for WW. However, total WTP for the stretch '+2' improvement package was similar across phases, with a value of £32.31 in the present study, compared to £36.74 in the previous phase.

Table 8. WTP Values for Service Improvements by Service Measure

Service measure	Unit	Levels			WTP (£/hh/yr)					
					SQ to +1			+1 to +2		
		SQ	+1	+2	Mean	Lower	Upper	Mean	Lower	Upper
River miles of 'less than good' quality (out of total of 2429 miles)	Miles	600	370	0	**£4.28**	£3.23	£5.33	**£6.89**	£5.20	£8.58
Long term outage – chance of being without water (12 hrs to 2 weeks)	Nr. of properties	80	40	10	**£1.83**	£1.29	£2.37	**£1.37**	£0.97	£1.77
Unexpected supply interruptions (3+ hours)	Nr. of properties	9,000	8,000	7,000	**£1.15**	£0.82	£1.49	**£1.15**	£0.82	£1.49
Sewer flooding in gardens/close to other properties	Nr. of properties	3,700	3,330	2,780	**£1.10**	£0.57	£1.63	**£1.64**	£0.85	£2.43
Pollution Incidents	Nr. Cat. 1/2/3 incidents/year	70	63	53	**£1.04**	£0.79	£1.30	**£1.49**	£1.12	£1.85
Sewer flooding inside property	Nr. of properties	180	160	140	**£0.93**	£0.48	£1.38	**£0.93**	£0.48	£1.38
Bathing waters of 'less than good quality'	%	4%	3%	0%	**£0.78**	£0.59	£0.97	**£2.33**	£1.76	£2.91
Pipe bursts	Nr. of bursts	1,800	1,620	1,440	**£0.69**	£0.36	£1.02	**£0.69**	£0.36	£1.02
Taste and odour (few days)	Nr. of properties	1,500	1,350	900	**£0.58**	£0.41	£0.76	**£1.75**	£1.24	£2.27
Temporary use ban (May to September)	Nr. of properties	1 in 100	1 in 200	1 in 500	**£0.27**	£0.14	£0.40	**£0.16**	£0.08	£0.24
Planned supply interruptions (3+ hours)	Nr. of properties	15,000	9,000	3,000	**£0.26**	£0.18	£0.33	**£0.26**	£0.18	£0.33
Water leakage	%	21%	20%	19%	**£0.15**	£0.08	£0.22	**£0.15**	£0.08	£0.22
Discolouration (few hours)	Nr. of properties	6,500	5,850	3,900	**£0.11**	£0.08	£0.14	**£0.32**	£0.23	£0.42
Total					*£13.17*			*£19.14*		

Lower and Upper values represent the bounds of the 95% confidence interval

5.3 Unit Values

We derive unit WTP values by simply dividing each SQ to +1 WTP value by its corresponding change in service level and multiplying by the number of properties (note that the same unit value will be obtained from +1 to +2 WTPs as we have modeled WTP as linear over the two service level ranges). The values obtained are presented in Table 9 below.

Table 9. Unit WTP Values for Water and Wastewater Service Improvements

Service measure	Unit	Unit WTP (£/unit/year)		
		Mean	**Lower**	**Upper**
Unexpected supply interruptions (3+ hours)	1 incident/prop.	**£632**	£447	£818
Planned supply interruptions (3+ hours)	1 incident/prop.	**£23**	£16	£30
Long term outage – chance of being without water (12 hrs to 2 weeks)	1 incident/prop.	**£25,035**	£17,679	£32,391
Discolouration (few hours)	1 incident/prop.	**£90**	£64	£117
Taste and odour (few days)	1 incident/prop.	**£2,132**	£1,505	£2,758
Temporary use ban (May to September)	Chance	**£54**	£28	£79
Water leakage	1% leakage	**£80,409**	£41,737	£119,080
Pipe bursts	1 burst/prop	**£2,104**	£1,092	£3,116
Sewer flooding inside property	1 incident/prop.	**£55,703**	£28,913	£82,492
Sewer flooding in gardens/close to other properties	1 incident/prop.	**£3,560**	£1,848	£5,272
Pollution incidents	1 Cat. 1/2/3 incident	**£177,464**	£134,000	£220,928
River miles of 'less than good' quality (out of total of 2429 miles)	1 mile of river improved	**£22,228**	£16,784	£27,671
Bathing waters of 'less than good quality'	1% beaches improved	**£928,935**	£701,423	£1,156,445

The values in the above table are for dual household customers only. However, they have all been derived such that the total value for all customers (including non-households and wastewater only customers) should be equal to a weighted average, as opposed to a sum, of each customer group's own value. This metric conforms to the approach taken in the prior WTP research and so the numbers can be directly compared.

For example:

- The dual household customer value of one fewer 'Unexpected supply interruptions (3+ hours)' is equal to £632 per year. The total value across all customers for one fewer 'Unexpected supply interruptions (3+ hours)' would be calculated as the weighted average of £632, and the value assumed for non-households who were not covered in this research.

- The dual household customer value of one fewer case per year of 'Sewer flooding inside property' is equal to £55,703 per year. The total value across all customers

for one fewer case of 'Sewer flooding inside property' would be calculated as the weighted average of £55,703, the value assumed for dual non-households who were not covered in this research, and the values assumed for wastewater only household and non-household customers who were also not covered by the research.

- In the case of 'Temporary use ban (May to September)', the value of £54 should be multiplied by the number of dual household customers to derive the value of avoiding a TUB by this group of customers.

- In the case of 'Water leakage', the dual household customer value of 1% less leakage overall is £80,409 per year. This value would need to be combined, in a weighted average, with a comparable value assumed for non-households to derive a total customer value estimate for 1% less leakage.

Similar interpretations apply in the case of the other service measures in Table 9.

5.4 Analysis of WTP Variation

Variation over Customer Segments

The results in Table 10 below show how WTP varied across gender, age and SEG customer segments. With respect to gender, the results show that females generally had a higher WTP for service improvements compared to males, with the exception of taste and odour and temporary use ban.

Moving to socioeconomic grade (SEG), WTP values were roughly of similar magnitude between A/B groups on the one hand, and the C1 group on the other. WTP values tended to generally decline for the C2 group, with the exceptions of taste and odour and pipe bursts, relative to the A/B and C1 groups. Though in aggregate the D/E WTP values were lower than A/B's and C1's, they remained higher than C2's WTP. Overall, this offers some support for the expectation that WTP declines with lower SEG's.

Finally, with respect to age, results indicate that in aggregate, customers aged 18 to 34 had substantially higher WTP than those aged 35 to 54 and those aged 55 or more.

Table 10. WTP Values for 'SQ to +1' Improvements by Service Measure and Customer Segment

	Gender		SEG				Age		
	Male	**Female**	**A/B**	**C1**	**C2**	**D/E**	**18-34**	**35-54**	**55+**
Service measure	**(N=265)**	**(N=233)**	**(N=287)**	**(N=88)**	**(N=56)**	**(N=55)**	**(N=127)**	**(N=178)**	**(N=155)**
Unexpected supply interruptions (3+ hours)	£0.61	£1.47	£1.06	£1.71	£0.35	£1.23	£0.92	£0.89	£1.04
Planned supply interruptions (3+ hours)	£0.00	£1.15	£0.00	£0.00	£0.39	£0.83	£0.63	£0.16	£0.00
Long term outage – chance of being without water (12 hrs to 2 weeks)	£1.08	£2.18	£1.74	£1.54	£1.30	£1.92	£1.13	£1.12	£1.67
Discolouration (few hours)	£0.24	£0.00	£0.70	£0.00	£0.21	£0.00	£0.61	£0.12	£0.00
Taste and odour (few days)	£0.56	£0.55	£0.49	£0.38	£0.55	£0.95	£0.45	£0.51	£0.21
Temporary use ban (May to September)	£0.35	£0.20	£0.09	£0.00	£0.80	£0.32	£1.05	£0.51	£0.00
Water leakage	£0.12	£0.00	£0.08	£0.18	£0.08	£0.00	£0.13	£0.00	£0.38
Pipe bursts	£0.57	£0.84	£0.53	£0.46	£0.82	£1.30	£0.27	£0.00	£1.33
Sewer flooding inside property	£0.78	£1.18	£0.87	£1.66	£0.57	£0.64	£0.28	£2.02	£0.73
Sewer flooding in gardens/close to other properties	£0.97	£1.38	£0.91	£1.88	£0.55	£1.56	£1.50	£0.97	£1.13
Pollution Incidents	£0.89	£1.26	£0.13	£1.78	£1.03	£0.96	£2.23	£1.84	£0.70
River miles of 'less than good' quality (out of total of 2429 miles)	£4.31	£4.38	£6.68	£4.15	£4.36	£3.23	£5.43	£3.35	£5.06
Bathing waters of 'less than good quality'	£1.09	£0.11	£1.26	£1.13	£0.00	£0.22	£0.87	£0.87	£0.60
Total	**£11.57**	**£14.70**	**£14.54**	**£14.87**	**£11.01**	**£13.16**	**£15.50**	**£12.36**	**£12.85**

Sensitivity to Sample Selection Criteria

In order to test the sensitivity of the results to ability to make comparisons, we re-estimated the econometric models on a sample that excluded all respondents who reported not being able to make comparisons when making choices. We then derived SQ to +1 WTP values from this model and contrasted the values to the one derived for the overall sample. Results are presented in Table 11.

We can observe that the restricted sample of respondents who stated they were able to make comparisons had generally slightly higher WTP values for most service measures compared to the overall sample, except for unexpected supply interruptions, water leakage and bathing water quality.

In most cases differences between the two samples are limited in magnitude. This suggests that the results from our overall sample are generally valid as they are in line WTP values obtained from the sample of respondents who found it easy to answer the survey. However, values for planned supply interruptions, discolouration, pollution incidents and river water quality were significantly different for the restricted sample than for the main sample. On this basis, we would recommend that WW uses the values reported in Table 11 to extend the sensitivity range when applying the WTP results presented in this report.

Table 11. WTP Values for SQ to +1 Improvements by Service Measure and Sample Selection Criteria

Service measure	Overall sample (N=511)	Respondents able to make comparisons (N=396)
Unexpected supply interruptions (3+ hours)	£1.15	£1.13
Planned supply interruptions (3+ hours)	£0.26	£0.53
Long term outage – chance of being without water (12 hrs to 2 weeks)	£1.83	£1.98
Discolouration (few hours)	£0.11	£0.42
Taste and odour (few days)	£0.58	£0.61
Temporary use ban (May to September)	£0.27	£0.40
Water leakage	£0.15	£0.09
Pipe bursts	£0.69	£0.76
Sewer flooding inside property	£0.93	£1.09
Sewer flooding in gardens/close to other properties	£1.10	£1.12
Pollution Incidents	£1.04	£1.98
River miles of 'less than good' quality (out of total of 2429 miles)	£4.28	£5.58
Bathing waters of 'less than good quality'	£0.78	£0.70
Total	**£13.17**	**£16.39**

Sensitivity to Bill Attitudes

We tested the impact of bill attitudes on WTP values using the method described in the section entitled 'Sensitivity to bill attitudes' in Appendix B. The WTP results are presented in Table 12 below.

Results show that people who stated that the bill they paid was 'Too little/about right' had higher WTP overall compared to the 'Too much' subgroup, as expected. However, some differences also emerge when looking at individual service measures.

Table 12. WTP Values for SQ to +1 Improvements by Service Measure and Bill Attitude

Service measure	Too little/About right (N=258)	Too much (N=253)
Unexpected supply interruptions (3+ hours)	£0.95	£1.42
Planned supply interruptions (3+ hours)	£0.64	£0.00
Long term outage – chance of being without water (12 hrs to 2 weeks)	£1.67	£1.79
Discolouration (few hours)	£0.21	£0.00
Taste and odour (few days)	£0.52	£0.68
Temporary use ban (May to September)	£0.00	£0.76
Water leakage	£0.00	£0.31
Pipe bursts	£0.74	£0.56
Sewer flooding inside property	£1.33	£0.41
Sewer flooding in gardens/close to other properties	£1.14	£1.00
Pollution Incidents	£1.91	£0.00
River miles of 'less than good' quality (out of total of 2429 miles)	£4.65	£3.85
Bathing waters of 'less than good quality'	£0.30	£1.40
Total	**£14.06**	**£12.18**

Respondents who stated that their current bill was 'Too little/about right' had lower WTP for unexpected supply interruptions, long term outage, taste and odour and bathing water quality. On the other hand, these respondents had a higher WTP for pipe bursts, the two sewer flooding attributes, pollution incidents and river water quality.

6   CONCLUSIONS AND RECOMMENDATIONS

This study was designed to obtain customer valuations of water and sewerage service measure changes via a series of discrete choice experiments. The research covered dual-service households only, and comprised a sample of 511 respondents, weighted to be representative of the WW customer base.

Our analysis of the data found that respondents appeared to be opposed to bill reductions, on average, to the extent that they would seemingly prefer any marginal improvement in service, or avoided deterioration, in preference to bill reductions. This finding mirrors similar results observed in the previous phase of WTP research undertaken for WW.

With respect to improvement packages, we found that dual service households were willing to pay up to a total of £13.17 per year, on average, for an intermediate improvement package. This represents a decrease in relation to the previous phase of WTP research for WW. However, total WTP for the stretch '+2' improvement package was similar across phases, with a value of £32.31 in the present study, compared to £36.74 in the previous phase.

Amongst the service improvements offered in the intermediate 'SQ to +1' package, the improvements to river water quality and long-term outages were estimated to have the highest value, while improvements to leakage and discolouration measures were found to have the lowest value.

Overall, the valuation estimates presented can be considered to be meaningful measures of WW customers' values for the range of services, and service levels, contained within the survey. As such, we recommend them as a key source of evidence for use within the triangulation exercise that WW intends to conduct to assimilate findings from a wide range of sources for PR19 business planning.

Confidence in the results reported here can be gained from the following:

- The design of the questionnaire was fully tested via a pilot test with households and businesses.

- A clear majority of responses were assessed as valid, taking into account respondents' feedback

- WTP varied plausibly across customer segments and with respect to attitudes to the current bill.

Appendix A

Questionnaire

| SYSTEM INFORMATION: |
| Date: |
| Time interview started: |

Introduction

Thank you very much for agreeing to complete this online survey which is being conducted by Accent. The closing date for completion of this survey is **25th October**.

We are carrying out research for **Wessex Water**, the company that supplies water and looks after the sewerage in your area.

The research is being conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm Accent's credentials please call the MRS free on 0500 396999.

The questionnaire will take about 20 minutes to complete. As a thank you for taking 20 minutes to help with the project, we will send you a £5 Amazon or M&S online voucher.

You do not have to answer questions you do not wish to and you can terminate the interview at any point. For convenience you can stop and return to complete the questionnaire as many times as you wish, although once submitted you will not be able to enter again.

IF MOBILE DEVICE SHOW: This survey is best undertaken on a tablet or a PC. If you do use a smartphone you can switch between desktop mode and mobile mode at any time by clicking the button at the bottom of the screen.

PLEASE USE THE **AT THE BOTTOM OF THE PAGE TO GO FORWARD. AS SOON AS YOU DO THIS YOUR ANSWER IS SAVED.**

IF YOU NEED TO GO BACK, PLEASE USE THE **BUTTON.**

IF YOU LEAVE THE SURVEY IDLE FOR 30 MINUTES, YOU WILL BE LOGGED OUT BUT DON'T WORRY YOU CAN GO STRAIGHT BACK IN TO THE POINT YOU LEFT OFF BY CLICKING ON THE LINK IN THE EMAIL WE SENT YOU

Scoping questions

We will first ask you a couple of questions to check that you are eligible to take part in this research.

Q1.   Do you or any of your close family work or have worked in the past in any of the following professions: market research or the water industry (including working for Wessex Water)? **PLEASE CLICK ON ONE OF THE ANSWERS BELOW.**

Yes **THANK & CLOSE**

No

Q2. Can you please confirm that you are responsible – either solely or jointly – for your household's water and waste bill?

Yes
No **THANK & CLOSE**

Q3. Does your property have a septic tank or cess pit?

If you do have one, this would mean that your property is <u>not</u> connected to the main sewer and you would periodically arrange to have the septic tank emptied.

Yes **THANK & CLOSE**
No
Don't know

Q4. We need to check that we are speaking to residents in specific parts of the Wessex Water area. Could you please tell us the first part of your postcode? For example, if your full postcode is BS2 2EN, please just record the first part, ie BS2. **PLEASE CLICK ON THE DROPDOWN MENU BELOW AND SELECT THE LETTERS IN THE FIRST PART OF YOUR POSTCODE. THEN CLICK ON THE BOX AND TYPE IN THE NUMBER(S) FROM THE FIRST PART OF YOUR POSTCODE**

Prefer not to answer **THANK AND CLOSE – NOT WITH ANY OTHER CODE**
None of the above letters **THANK AND CLOSE – NOT WITH ANY OTHER CODE**

Q5. Just to check, this makes your postcode **[insert drop down PC area and PC district from Q4]. Is** this correct?

Yes
No, I would like to go back to the previous question and amend **GO BACK TO Q4**

Q6. **ASK IF CONFIRMED POSTCODE MATCHES LOOK UP:** According to our records, both your water and sewerage are supplied by Wessex Water. Is that correct?

Yes
No **THANK & CLOSE**
Don't know **THANK & CLOSE**

Q7. **ASK IF CONFIRMED POSTCODE DOES NOT MATCH LOOK UP:** Who supplies your water and sewerage services?

Wessex Water supplies both my water and sewerage services
Wessex Water supplies sewerage only, another company supplies my water **THANK AND CLOSE**
Wessex Water supplies my water services only, another company supplies my sewerage **THANK AND CLOSE**
Other supplier for both water and sewerage service **THANK AND CLOSE**
Don't know **THANK AND CLOSE**

CHECK QUOTA

Q8. Which of the following best describes your household?

Owner Occupier (with or without mortgage)	HOMEOWNER
Shared Ownership or Keyworker	HOMEOWNER
Private Rented	TENANT
Social Housing rented (Council Housing, Housing Association or similar)	TENANT
Prefer not to say	
Don't know **THANK & CLOSE**	

Q9. **IF Q8=3 OR 4 (TENANT) ASK, OTHERS GO TO Q10:** Is your water and sewerage bill included in your rental payment, or do you pay directly to Wessex Water?

Included in rent **THANK & CLOSE**
Pay directly to Wessex Water
Don't know **THANK & CLOSE**

Q10. Do you currently have any on-going complaints or issues with Wessex Water?

Yes
No **GO TO Q12**

Q11. What is the nature of your complaint?

Please type in:

Q12. **APPROX. SEG** How would you describe the occupation type of the chief income earner in your household?

Senior managerial or professional
Intermediate managerial, administrative or professional
Supervisor; clerical; junior managerial, administrative or professional
Manual worker (with industry qualifications)
Manual worker (with no qualifications)
Unemployed
Retired
Student
Prefer not to say **SKIP TO SEG**

Q13. **IF Q12=7 (RETIRED), ASK ELSE SKIP** Does the chief income earner have a state pension, a private pension or both?

State only
Private only
Both

Q14. **IF Q13= PRIVATE OR BOTH, ASK ELSE SKIP** How would you describe the chief income earner's occupation type before retirement?

Senior managerial or professional
Intermediate managerial, administrative or professional
Supervisor; clerical; junior managerial, administrative or professional
Manual worker (with industry qualifications)
Manual worker (with no qualifications)
None of these

SEG   CODE AS FOLLOWS:
IF **Q12**= 1 or 2; SEG = AB
IF **Q12** = 3 or 4; SEG = C1/C2
IF **Q12**= 5; SEG = DE
IF **Q12**= 6; SEG = DE
IF **Q12**= 8; SEG = C1/C2

IF **Q12** = 7 and **Q13**= State only; SEG = DE

IF **Q12**= 7 and **Q13**= Private only OR Both and Q14= 1; SEG = AB
IF **Q12**= 7 and **Q13**= Private only OR Both and Q14= 2; SEG = AB
IF **Q12**= 7 and **Q13**= Private only OR Both and Q14= 3; SEG = C1/C2

CHECK QUOTAS

Q15. What was your age at your last birthday? **PLEASE CLICK ON THE BOX BELOW AND TYPE YOUR ANSWER**

Prefer not to say

DP: PROGRAMME INTO BANDS
18-24
25-34
35-44
45-54
55-64
65-74
75 or older
Prefer not to say

CHECK QUOTAS

Q16. Are you…

Male
Female
Prefer not to say

CHECK QUOTAS

Q17. Do you have a water meter?

Yes
No
Don't know

Q18. How much is your bill from Wessex Water? You can give this as either a weekly, monthly or annual figure, whichever is easier for you. If you do not know exactly, please try and give your best estimate.

£ per week
£ per month
£ per year
Don't know

Q19. **HIDDEN QUESTION:** CALCULATE ANNUAL BILL FROM Q18

£ per year
If DK, code as £461

Background questions

Thank you, you are in scope for the survey.

The questionnaire will take about 18 minutes to complete.

You do not have to answer questions you do not wish to and you can terminate the interview at any point. For convenience you can stop and return to complete the questionnaire as many times as you wish, although once submitted you will not be able to enter again.

Q20. Together with other organisations Wessex Water is responsible for the quality of river and coastal bathing waters. It would be useful to understand some of your responses to this survey by also understanding whether you spend any of your leisure time in or around rivers or beaches. Do you practice any of the following leisure activities? **PLEASE TICK ALL OPTIONS THAT APPLY TO YOU.**

Fishing/angling
Swimming/paddling in the sea/rivers
Sailing
Visiting beaches and/or river banks
Surfing
None **CHECK LOGIC**

Q21. On a scale of 1 to 5, where 1 is 'very uninformed' and 5 is 'very informed', how informed do you feel about the quality of environment? **SINGLE CODE**

Very uninformed
Uninformed
Neither uninformed nor informed
Informed
Very informed

Q22. **IF Q18= 4 (DK):** Currently the average household water and sewerage bill in your area is £461 per year or £38 per month. **ELSE:** Previously you told us that your bill from Wessex Water is **[INPUT FROM Q18: please include per week/per month/per year]. IF Q18=1 ADD:** This calculates as **[INPUT FROM Q19]** per year. **IF Q18=2 ADD:** This calculates as **[INPUT FROM Q19]** per year.

How do you feel about the amount that you pay Wessex Water for water and waste water? Is it…
Far too little
Too little
About right
Slightly too much
Far too much
Don't know

Quality of Drinking Water, Interruptions and Supply Stoppages

We would now like you to make some choices about options for the water supply in your area, and about the bill you have to pay by 2024 if each option was undertaken by Wessex Water. The choices are only about the water supply element of your bill, and no changes to sewerage services are considered in this survey.

The first choices look at the possibility that there might be interruptions to your water supply or changes to the quality of your drinking water. Specifically, the choices involve the service failures listed below.

If you would like to see more information please click on the button.

- **UNEXPECTED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more**

  HOVER BUTTON: Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent. The water supply at your property can be interrupted due to burst pipes, which can happen at any time.

  When an unexpected interruption occurs, properties are affected for five and a half hours on average. 90% of interruptions are less than 12 hours. Currently the number of properties affected by this in the Wessex Water area in any year is around 9,000 (1.5% of total). That's out of a total of 590,000 water properties.

- **PLANNED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more**

  HOVER BUTTON: Sometimes your water supply can be interrupted. This means that you may have no water for a period of time, or your supply could be intermittent. The water supply at your property can be interrupted due to planned maintenance, in which case you would be given at least 48 hours' notice.

  When a planned interruption occurs, properties are affected for four and a half hours on average. 100% of interruptions are less than 12 hours. Currently the number of properties affected by this in the Wessex Water area in any year is around 15,000 (2.5% of total). That's out of a total of 590,000 water properties.

- **LONG-LASTING SUPPLY STOPPAGE 12 hours to 2 weeks**

  HOVER BUTTON: A long-lasting stoppage to the water supply at your property lasting from 12 hours to 2 weeks. Currently the number of properties affected by this in the Wessex Water area in any year is around 80 (0.014% of total). That's out of a total of 590,000 water properties.

- **DISCOLOURED WATER at your property for a few hours**.

  HOVER BUTTON: On rare occasions, your water may be discoloured because of harmless deposits that accumulate over time in water mains, but the water is safe to drink. We wouldn't expect anyone to drink it when it looks unpleasant. Even if you run your tap for several minutes, the water would still be brown/discoloured. This would typically last for a few hours at a time.

  Currently 6,500 properties (1.1% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 590,000 water properties.

- **NON IDEAL TASTE AND SMELL OF YOUR TAP WATER**

  HOVER BUTTON: Water taste and smell can be less than ideal at your property for a few days at a time because of dissolved minerals and gases, but the water is safe to drink.

  Currently 1,500 properties (0.25% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 590,000 water properties.

Reducing the number of these events could be costly for Wessex Water and it would increase customers' water and sewerage bills.

Letting the numbers of these events increase, if this was acceptable to customers, might reduce costs and reduce bills. So the choices customers make about service levels could affect the amount they pay for water and waste water.

We would like you to choose between a 'Package A' and a 'Package B' with different numbers of each type of service issue and different effects on your bill in each case.

The options will be presented in the following format.

	The number of properties affected in the Wessex Water area in any one year	
	PACKAGE A	PACKAGE B
UNEXPECTED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	7,000 properties	11,500 properties
PLANNED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	3,000 properties	19,000 properties
LONG-LASTING SUPPLY STOPPAGE 12 hours to 2 weeks	80 properties	10 properties
DISCOLOURED WATER at your property for a few hours	3,900 properties	6,500 properties
NON IDEAL TASTE AND SMELL OF YOUR TAP WATER	1,740 properties	900 properties
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	Decrease of £20 by 2024 *Gradual decrease of £4 every year between 2019 and 2024*	Increase of £20 by 2024 *Gradual increase of £4 every year between 2019 and 2024*

The next screen explains what the different parts of this mean.

Sometimes a Package may say "NO CHANGE" in the bill, but still include a change in the water supply service.

When making your choices please remember that:

- Your water bill will also increase by inflation

- Other household bills may go up or down, affecting the amount of money you have to spend in general

- Your household income and expenses might change, so think about your overall financial situation when making your decisions

- Any money you pay to improve service levels will not be available for you to spend on other things

- Any choices you make to increase or reduce your bill up to 2024 are permanent and will still apply after 2024.

Q23.   In the first set of options, the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]. Which option do you prefer?

A
B

Q24.	Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024"**]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**. Which option do you prefer?

A
B

Q25.	In this question, in Option A there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**, and in Option B **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**. Which option do you prefer?

A
B

Q26.	Here, in Option A there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**, and in Option B **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**. Which option do you prefer?

A
B

Q27.	And finally, in this set of options the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**. Which option do you prefer?

A
B

Temporary Use bans, Leakage, Pipe bursts and Sewer flooding

The second set of choices involves the service failures listed below. As before, if you would like to see additional information, please click on the blue hover buttons.

- **HOSEPIPE BAN (FROM MAY TO SEPTEMBER)**
  HOVER BUTTON: As a result of drought conditions, Wessex Water can impose a ban on using a hosepipe at your property that would typically last from May to September (5 months). For this period, you would not be allowed to use a hosepipe to water a garden or clean a private car or van, and you would not be allowed to fill a swimming or paddling pool if you have one. Currently, the chance that this happens to a property in the Wessex Water area in any year is around 1 in 100.

  An alternative way of explaining this is that there is a 12% chance that your property will experience this problem over the course of Wessex Water's 25 year plan.

- **WATER LEAKAGE**

HOVER BUTTON: Water can leak from Wessex Water's extensive network of pipes. Wessex Water can proactively detect and repair leaks, and replace or refurbish sections of pipework to reduce the extent of leakage. Currently 21% of the water that is treated by Wessex Water gets lost due to leakage.

- **PIPE BURST**

  HOVER BUTTON: Burst pipes on our extensive network can occur due to damage from ground movement after frosts, traffic or due to the age of the pipes. Currently Wessex Water have 1,800 bursts per year.

- **SEWER FLOODING INSIDE YOUR PROPERTY**

  HOVER BUTTON: Flooding from the sewer gets inside properties, causing damage to property. When this happens, substantial clean up and repair of flooring and walls may be needed

  Currently 180 properties (0.03% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 1,200,000 wastewater properties.

- **SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY**

  HOVER BUTTON: Flooding from the sewer gets close to people's properties, or gets into their gardens. Currently 3,700 properties (0.63% of total) in the Wessex Water area are affected by this in any year. That's out of a total of 1,200,000 wastewater properties.

Again, we would like you to choose between a 'Package A' and a 'Package B'. As before, the choices could affect future bills. When making your choices, please remember that your bill will increase due to inflation, and your income and other expenses may change in the coming years.

The choices will be presented in the following format:

	PACKAGE A	PACKAGE B
HOSEPIPE BAN (FROM MAY TO SEPTEMBER) *The chance that this happens at your property in any one year is*	*1 in 500*	*1 in 50*
WATER LEAKAGE *The proportion of water that is treated and lost due to leakage*	*19%*	*22%*
PIPE BURST *The number of pipe bursts in the Wessex Water are in any one year is*	*1,800 bursts*	*1,440 bursts*
SEWER FLOODING INSIDE YOUR PROPERTY *The number of properties affected in the Wessex Water area in any one year is*	*140 properties*	*180 properties*
SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY *The number of properties affected in the Wessex Water area by this in any one year is*	*4,070 properties*	*2,780 properties*
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	Decrease of £20 by 2020 *Gradual decrease of £4 every year between 2019 and 2024*	Increase of £20 by 2024 *Gradual increase of £4 every year between 2019 and 2024*

Q28. In the first set of options, the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]. Which package do you prefer?

A
B

Q29. Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024"], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A

B

Q30. In this question, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024"], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A

B

Q31. Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024"], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A

B

Q32. And finally, in this question the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024**]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A

B

Pollution Incidents, Quality of Rivers and Quality of Coastal Bathing Waters/Beaches

The third set of choices concerns pollution incidents, and the quality of river and coastal bathing water:

- **POLLUTION INCIDENTS resulting from overflows within the sewerage network**
  HOVER BUTTON: Overflows or bursts within the public sewerage network can occasionally affect the quality of rivers and coastal bathing waters and beaches. There are currently around 70 incidents per year.

- **RIVER WATER QUALITY**
  HOVER BUTTON: Currently, around 600 miles of river out of a total of 2,429 in the Wessex Water wastewater area (25% of total) is classified as 'less than good'. This means that animal and plant life is affected (eg some species may be missing) and there may be some pollution or murky water

- **BATHING WATER QUALITY**

HOVER BUTTON: The cleanliness and quality of coastal bathing water and beaches in your area is classified according to the chances of getting an infection such as an upset stomach, an ear infection or a sore throat after bathing in the sea. Currently, 4% of bathing waters in the Wessex Water waste water area are classied as 'less than good'. This means that 8 or more people out of 100 have a chance of getting an infection after bathing in them.

Again, we would like you to choose between a 'Package A' and a 'Package B'. The first three rows of the card show the options for the number of pollution incidents, river water quality and bathing water quality both under Package A and Package B. The final row shows the change in your water and sewerage bill associated with the two packages.

As before, the choices could affect future bills. When making your choices, please remember that your bill will increase due to inflation, and your income and other expenses may change in the coming years.

The choices will be presented in the following format:

	PACKAGE A	PACKAGE B
POLLUTION INCIDENTS resulting from overflows within the sewerage network *The number of pollution incidents in the region in any one year is*	53 incidents	88 incidents
RIVER WATER QUALITY *Miles of river at less than good status (out of 2,429 miles in total) in any one year*	990 miles	0 miles
BATHING WATER QUALITY *Percentage of beaches at less than good status (out of 47 beaches in total) in any one year*	6%	0%
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above	Decrease of £20 by 2020 *Gradual decrease of £4 every year between 2019 and 2024*	Increase of £40 by 2024 *Gradual increase of £8 every year between 2019 and 2024*

Q33. In the first set of options, the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**. Which package do you prefer?

A
B

Q34. Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £[INSERT] by 2024" /"a bill decrease of £[INSERT] by 2024"]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**. Which option do you prefer?

A
B

Q35. In this question, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £[INSERT] by 2024" /"a bill decrease of £[INSERT] by 2024"]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £[INSERT] by 2024" /"an associated bill decrease of £[INSERT] by 2024"]**. Which option do you prefer?

A
B

Q36. Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024**]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**. Which option do you prefer?

A
B

Q37. And finally, in this question the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**. Which option do you prefer?

A
B

Changes to Service and Bill Levels

In these final choices we would like you to consider all of the options together. Please say which package you prefer, Package A or Package B.

When making your choices, please remember that your bill will increase due to inflation, and your income and other expenses may change in the coming years.

The choices will be presented in the following format:

		PACKAGE A	PACKAGE B
GAME 1	UNEXPECTED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	11,500 properties	7,000 properties
	PLANNED SUPPLY INTERRUPTIONS at your property lasting 3 hours or more	19,000 properties	3,000 properties
	LONG-LASTING SUPPLY STOPPAGE 12 hours to 2 weeks	160 properties	10 properties
	DISCOLOURED WATER at your property for a few hours	7,560 properties	3,900 properties
	NON IDEAL TASTE AND SMELL OF YOUR TAP WATER	1,740 properties	900 properties
GAME 2	HOSEPIPE BAN (FROM MAY TO SEPTEMBER)	1 in 500	1 in 50
	WATER LEAKAGE	19%	22%
	PIPE BURST	1,440 bursts	1,980 bursts
	SEWER FLOODING INSIDE YOUR PROPERTY	140 properties	200 properties
	SEWER FLOODING IMMEDIATELY OUTSIDE YOUR PROPERTY	2,780 properties	4,070 properties
GAME 3	POLLUTION INCIDENTS resulting from overflows within the sewerage network	88 incidents	53 incidents
	LESS THAN GOOD RIVER WATER QUALITY (out of 2,429 miles of river in total)	990 miles	0 miles
	LESS THAN GOOD BATHING WATER QUALITY (out of 47 beaches)	6%	0%
THE CHANGE IN YOUR ANNUAL WATER AND SEWERAGE BILL above inflation to provide the service package above		Increase of £60 by 2024 *Gradual increase of £12 every year between 2019 and 2024*	Decrease of £30 by 2024 *Gradual decrease of £6 every year between 2019 and 2024*

Q38. In the first set of options, the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024]**, and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"**]**. Which option do you prefer?

A
B

Q39. Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024"], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A
B

Q40. In this question, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024"], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A
B

Q41. Here, the service levels in Option A would lead to **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "a bill increase of £**[INSERT]** by 2024" /"a bill decrease of £**[INSERT]** by 2024"], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A
B

Q42. And finally, in this question the service levels in Option A would mean **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION A:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"], and in Option B there would be **[DP: CHANGE ACCORDING TO BILL LEVEL FROM OPTION B:** "no change in your bill"/ "an associated bill increase of £**[INSERT]** by 2024" /"an associated bill decrease of £**[INSERT]** by 2024"]. Which option do you prefer?

A
B

Follow-up Questions

We would now like to ask you a few questions about the choices you have just made.

Q43. Did you generally feel able to make comparisons between the options presented to you?

Yes **GO TO Q45**
No

Q44. Why weren't you able to make the comparisons in the choices? **PLEASE CLICK ON THE BOX BELOW AND TYPE YOUR ANSWER**

Q45. Did you find each of the levels of service we described easy to understand?

Yes **GO TO** Error! Reference source not found.
No

Q46. Which levels did you feel were not easy to understand and why?

Q47. Were any of the service levels so low or so high that they were implausible?

Yes
No **GO TO Q49**

Q48. Which levels did you feel were not plausible?

Classification Questions

We now need to ask you a few questions about you and your household. These will only be used to ensure we have spoken to a wide range of customers. All responses will be kept strictly confidential.

Q49. What is your employment status?

Working full-time (30+ hours a week)
Working part-time (8-29 hours a week)
Not working – looking for work
Not working – not looking for work
Full-time student
Part-time student
Retired
Retired unpaid voluntary work
Looking after family/home
Other **SPECIFY**
Prefer not to say

Q50. Which of these best describes the highest level of education that you have completed?

No qualifications
Level 1: 1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic/Essential Skills;
Level 2: 5+ O Level (Passes)/CSEs (Grade 1)/GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma;
Apprenticeship
Level 3: 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, Welsh Baccalaureate Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma;
Level 4 and above: Degree (for example BA, BSc), Higher Degree (for example MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (for example teaching, nursing, accountancy);
Other qualifications: Vocational/Work-related Qualifications, Foreign Qualifications (not stated/level unknown).

Q51. Do you receive any of the following benefits? **PLEASE TICK ALL OPTIONS THAT APPLY TO YOU**.
MULTICODE

Attendance Allowance
Carer's Allowance
Child Tax Credit
Council Tax Benefit
Disability Living Allowance
Housing Benefit
Income Support (or similar)
Jobseeker's Allowance
Pension Credit
Universal Credit
Working tax credit
None of these **CHECK LOGIC**
Prefer not to say **CHECK LOGIC**

Q52. Thinking about all the people in your household, including yourself, how many people live here for each of these age groups? **FOR EACH AGE GROUP, PLEASE SELECT THE OPTION THAT APPLIES TO YOU. IF THERE ARE NO PEOPLE IN YOUR HOUSEHOLD BELONGING TO A CERTAIN AGE GROUP, PLEASE SELECT 'ZERO' FOR IT.** DP PLEASE PREVENT 4 0'S BEING ENTERED

	0	1	2	3	4	5+
Up to 5 years						
6 to 15 years						
16 to 65 years						
Over 65 years						

Prefer not to say

DP: THE ERROR MESSAGE THEY SEE IF THEY HAVEN'T ANSWERED SHOULD SAY "THIS QUESTION MUST BE ANSWERED. IF THERE ARE NO PEOPLE IN YOUR HOUSEHOLD BELONGING TO A CERTAIN AGE GROUP, PLEASE SELECT 'ZERO' FOR IT."

Q53. And finally, what type of property do you live in?

Flat
Terraced house
Semi-detached house
Detached house
Bungalow
Prefer not to say

Q54. How would you rate your enjoyment in completing this survey? Please use a scale of 1 to 10 where 1 means 'low level of enjoyment' and 10 means 'high level of enjoyment'.

Low level of enjoyment	1	2	3	4	5	6	7	8	9	10	High level of enjoyment

---

Q54B Accent, on behalf of Wessex Water, would like to thank you for taking the time to complete this questionnaire. As mentioned, we will provide you with a £5 Amazon or M&S online voucher or make a donation to a charity on your behalf. Charity donations will be to WaterAid (charity number 288701). Please tell us which you would prefer?

Amazon voucher
M&S voucher
Charity donation **GO TO Q55**

Q54C **IF Q54B=1-2:** We will send your #Q54B# to your email address. Please enter your email address.

Email address:

Q55. We really appreciate the time that you have given us today. Would you be willing to be contacted again for clarification purposes or be invited to take part in other research for Wessex Water?

Yes, for both clarification and further research
Yes, for clarification only
Yes, for further research only
No

Q56. Wessex Water likes to hear what their customers think of their service. They have been running an online customer panel called Wessex Water 'Have Your Say' for nearly 4 years and have over 2,000 members. They would now like to invite you to join their panel. As a panel member you will be asked to take part in a short survey roughly every 3 months.

The surveys are about Wessex Water and things that matter to you as customers. The information is used to help Wessex Water provide you with a better service now and in the future.

If you want to find out more, visit www.wessexwater.co.uk/haveyoursay

If you sign up, you are under no obligation and can leave the panel at any time.

If you are interested in joining the panel, please click **here**.

Thank you. This research was conducted under the terms of the MRS code of conduct and is completely confidential.

PLEASE PRESS THE SUBMIT BUTTON AT THE BOTTOM OF THE PAGE TO EXIT THE SURVEY.

SYSTEM INFORMATION
Time interview completed:

Appendix B

Econometric Analysis

APPENDIX B   ECONOMETRIC ANALYSIS

Introduction

This appendix contains all the models and interim calculations used to derive the core household valuation results presented in the main body of this report. It also contains multivariate explanatory models of respondents' choices to explore their validity.

Figure 9 illustrates the formulae used for calculating levels (e.g. SQ to +1 or +1 to +2) and unit values from the estimates obtained from each set of choice exercise responses. This figure shows that the value for a service level change is derived as the product of a "service measure weight", a "whole package value" and a "relative utility of service measure". The unit value is then obtained by dividing the levels value by the corresponding change in the number of units of that service measure and multiplying by the number of properties.

Consistent with this figure, there are a series of steps that must be taken to obtain unit values.

- First, we calculate service measure weights, which are the relative values of each of the service measure changes within the whole package, when each service measure moves from the worst to the best level. The results for these weights are derived from responses to the package DCE and the lower level DCEs.

- Second,, we calculate whole package valuations based on the package DCE responses. The whole package value is the value of joint -1 to +2 (i.e. maximum) improvement across the service measures of all three lower level exercises.

- Third, we derive relative utilities for each service measure as the ratio of its levels change of interest (i.e. SQ to +1 or +1 to +2) to the maximum -1 to +2 levels change.

- Fourth, we use these whole package values, combined with the service measure weights and relative utilities, to obtain estimates of levels (SQ to +1 or +1 to +2) WTP values.

- Finally, we obtain unit values by dividing the SQ to +1 levels values the change in units over the relevant range. These values are aggregated to the WW customer base using information on numbers of customers supplied by WW.

Figure 9: Formulae for Calculating WTP for Service Level Changes and Unit Values
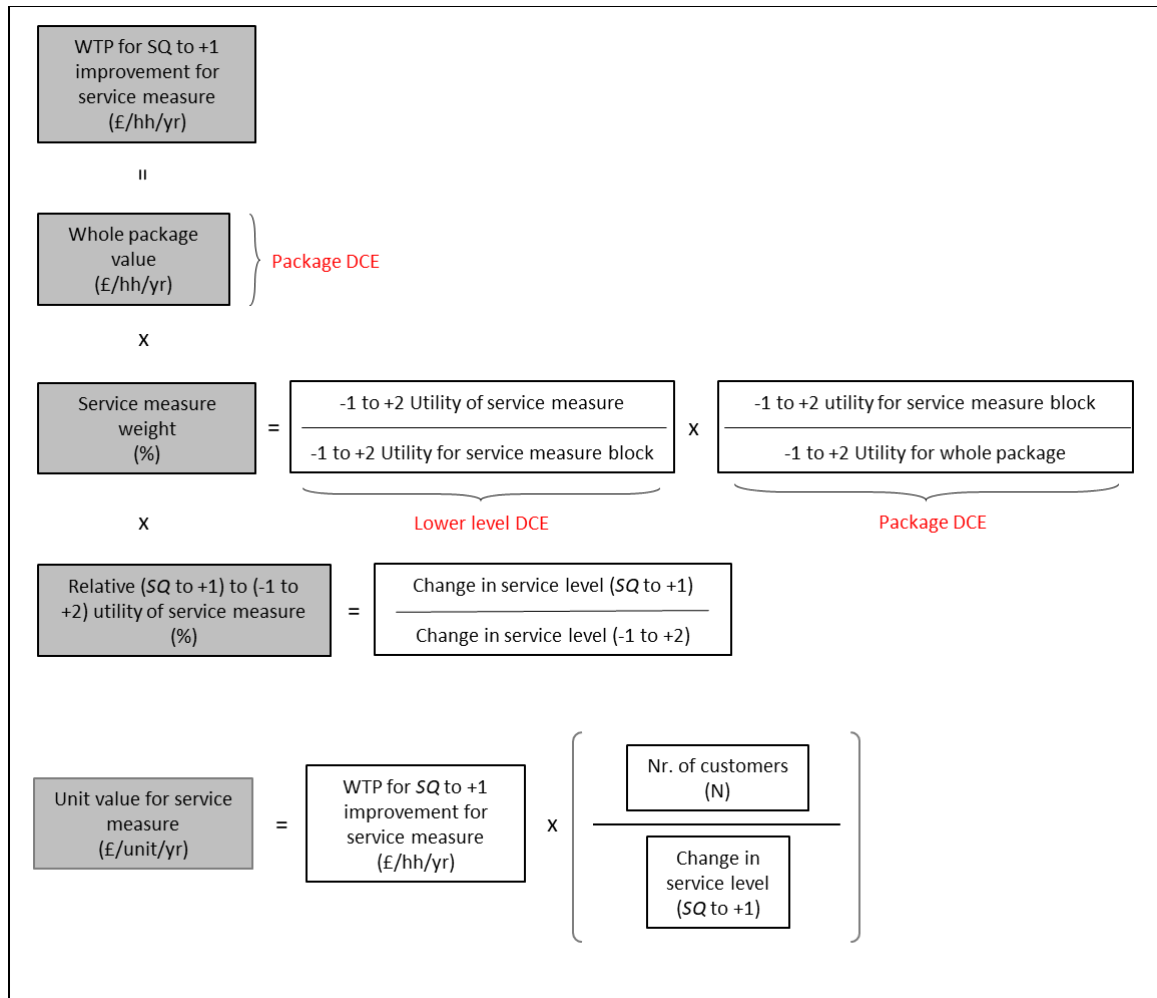
In the remainder of this appendix, we proceed as follows. First, we present results from an econometric analysis of lower level choice exercise responses. The package DCE models are presented next. The package DCE models are then used to derive our main estimates of willingness to pay. For both lower level and Package exercises, we estimate non-linear models in which a bill coefficient was estimated only for bill increases, while setting the bill coefficient at zero for negative bill changes. The reason is that when the models were fitted with freely estimated bill coefficients for negative bill increases, these turned out to be invariably positive across all lower level and Package exercises. Indeed this indicates that customers are not willing to trade off service deteriorations for any bill reductions.

We then present a further set of econometric models which examine the extent to which choices vary in line with expectations. This analysis contributes to an assessment of the validity of the results.

Core Models

The model results are shown in Table 13, Table 14, Table 15 for Exercises 1, 2 and 3, respectively, along with the resulting preference weights that are presented in Table 16. Results for the Package exercise are then presented in Table 17 along with WTP estimates which are used to apportion WTP to individual service measures using the

lower level exercises' model estimates. It is worth noting that all the estimated core models were mixed logit (MXL) that account for heterogeneity in preferences for service measures, while fixing the bill coefficient.

Overall, results for the lower level exercises show that models have good fits (as attested by the relatively high pseudo R^2 coefficients) and are well-behaved in general. Bill coefficients are all negative (as expected) across all three exercises. Moreover, all service measures' coefficients have the correct signs. Looking at mean coefficients, only planned interruptions and discoloration in exercise 1, and leakage in exercise 2, are insignificant, while temporary use ban in exercise 2 is only significant at the 10 percent significance level. Finally, all standard deviation estimates are significant except taste and odour in exercise 1, leakage in exercise 2 and bathing water quality in exercise 3.

Table 13: Exercise 1 DCE Model Estimates

Variable	Unit	Mean		Std. dev.	
Unexpected supply interruptions (3+ hours)	Properties	-0.00011		0.00018	
		(0.00002)	***	(0.00005)	***
Planned supply interruptions (3+ hours)	Properties	-0.000004		0.00005	
		(0.000005)		(0.00001)	***
Long term outage – chance of being without water (12 hrs to 2 weeks)	Properties	-0.00455		0.00518	
		(0.00064)	***	(0.00124)	***
Discolouration (few hours)	Properties	-0.00002		0.00032	
		(0.00003)		(0.00004)	***
Taste and odour (few days)	Properties	-0.00038		0.00001	
		(0.00009)	***	(0.00020)	
Positive bill change	£/hh/yr	-0.03424		-	
		(0.00226)	***	-	
Observations		2555			
LL		-1528.96			
Pseudo R2		0.137			

*Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 14 Exercise 2 DCE Model Estimates

Variable	Unit	Mean	Std. dev.
Temporary use ban (May to September)	Chance	-10.17581 (5.37634) *	58.42487 (10.95618) ***
Water leakage	%	-0.02788 (0.02633)	0.12072 (0.09220)
Pipe bursts	Nr. of bursts	-0.00073 (0.00018) ***	0.00166 (0.00035) ***
Sewer flooding inside property	Properties	-0.00886 (0.00180) ***	0.02233 (0.00275) ***
Sewer flooding in gardens/close to other properties	Properties	-0.00057 (0.00007) ***	0.00000 (0.00035)
Positive bill change	£/hh/yr	-0.04081 (0.00248) ***	- -
Observations LL Pseudo R2		2555 -1454.65 0.179	

Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 15 Exercise 3 DCE Model Estimates

Variable	Unit	Mean	Std. dev.
Pollution incidents	Nr. Cat. 1/2/3 incidents/year	-0.00867 (0.00271) ***	0.02702 (0.00447) ***
River miles of 'less than good' quality (out of total of 2429 miles)	Miles	-0.00109 (0.00012) ***	0.00179 (0.00017) ***
Bathing waters of 'less than good quality'	%	-0.04541 (0.01450) ***	0.00533 (0.04696)
Positive bill change	£/hh/yr	-0.02899 (0.00226) ***	- -
Observations LL Pseudo R2		2555 -1592.22 0.101	

Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 16 shows the workings involved in the calculation of the lower level preference weights and relative utilities. These weights are used to represent the relative value of each service measure's service level change (from its worst level to its best level), within the lower level block.

The coefficient column in the table contains the mixed logit estimates from Table 13, Table 14 and Table 15. The unit change column is the difference between the worst and best levels for the service measure in question. Utility change is calculated as coefficient*unit change. The relative utility is calculated as the ratio of the SQ to +1 unit

change to the -1 to +2 unit change. Finally, the lower level preference weight is calculated as the utility change for the service measure in question divided by the sum of utility changes over all the service measures.

Table 16. Lower Level Preference Weights

Service measure	Coefficient	Unit change	Utility change	Relative utility	Service measure weight
Lower level exercise 1					
Unexpected supply interruptions (3+ hours)	-0.00011	-4500	0.5171	22.2%	31.3%
Planned supply interruptions (3+ hours)	-0.000004	-16000	0.0677	37.5%	4.1%
Long term outage – chance of being without water (12 hrs to 2 weeks)	-0.00455	-150	0.6823	26.7%	41.3%
Discolouration (few hours)	-0.00002	-3660	0.0600	17.8%	3.6%
Taste and odour (few days)	-0.00039	-840	0.3253	17.9%	19.7%
SUB-TOTAL			*1.6524*		*100.0%*
Lower level exercise 2					
Temporary use ban (May to September)	-10.17581	-0.018	0.1832	27.8%	9.5%
Water leakage	-0.02788	-3	0.0836	33.3%	4.4%
Pipe bursts	-0.00073	-540	0.3939	33.3%	20.5%
Sewer flooding inside property	-0.00886	-60	0.5315	33.3%	27.6%
Sewer flooding in gardens/close to other properties	-0.00057	-1290	0.7303	28.7%	38.0%
SUB-TOTAL			*1.9224*		*100.0%*
Lower level exercise 3					
Pollution Incidents	-0.00867	-35	0.3036	20.0%	18.4%
River miles of 'less than good' quality (out of total of 2429 miles)	-0.00109	-990	1.0756	23.2%	65.1%
Bathing waters of 'less than good quality'	-0.04541	-6	0.2724	16.7%	16.5%
SUB-TOTAL			*1.6517*		*100.0%*

Coefficients are drawn from the mixed logit models in Table 13, Table 14 and Table 15. Unit changes are drawn from the experimental design. Utility change is calculated as coefficient * unit change, and preference weight is calculated as utility change divided by the sum of utility changes within the corresponding service measure block. Finally, relative utility is the ratio of the SQ to +1 unit change to the -1 to +2 unit change.

As for the package model (Table 17), the results are in line with expectation in that all mean coefficients have the expected signs and are all significant at least at the 1% significant level. Moreover, standard deviation coefficients for lower level exercises 2

and 3 are also significant at the 1% level, while exercise 1's turned out to be insignificant. Again, this indicates that heterogeneity is substantial in this DCE and needs to be accounted for.

As for the WTP estimates, exercise 3 commanded the highest WTP, followed by 1 and 2. The three WTP values sum up to roughly £55.03/hh/year for a -1 to +2 service level change across all service measures. Such a yearly payment in return for this improvement in service levels looks reasonable, and suggests no propensity on the part of respondents to inflate their stated WTP values.

Table 17. Package DCE Model and WTP Estimates

Variable	Unit	Mean		Std. dev.		WTP (£/hh/yr)	
SP1		0.42018		-0.05122		£16.61	
		(0.06203)	***	(0.35965)		(£2.49)	***
SP2		0.25618		0.54955		£10.13	
		(0.06235)	***	(0.12523)	***	(£2.48)	***
SP3		0.71602		1.46055		£28.30	
		(0.08986)	***	(0.11112)	***	(£3.54)	***
Whole package (SP1+SP2+SP3)						£55.03	
						(£5.62)	***
Positive bill change	£/hh/yr	-0.02530		-			
		(0.00144)	***	-			
Observations		2555					
LL		-1372.35					
Pseudo R2		0.225					

Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 18 shows the workings for the calculation of the service measure block weights. The utility coefficient column contains the mixed logit estimates from Table 17. The variables to which the coefficients refer are dummy variables representing the total change in service levels between the worst and best levels for all service measures in the relevant block. The service measure block weights are therefore simply calculated as the coefficient divided by the sum of the three coefficients.

Table 18: Household Service Measure Block Weights

Service measure block	Utility coefficient	Service measure block weight
Lower level exercise 1	0.42018	30%
Lower level exercise 2	0.25618	18%
Lower level exercise 3	0.71602	51%

Utility coefficients are drawn from the mixed logit models in Table 17. Service measure block weights are equal to the utility coefficient for that service measure block, divided by the sum of all utility coefficients for the customer type.

Covariate Analysis

Variation over customer segments

In order to investigate the variation of our estimates by segments, we re-estimated the lower level and package DCEs on socioeconomic group (SEG), gender and age subsamples. Results are presented in Table 19, Table 20, Table 21and Table 22 for the lower level exercises 1, 2 and 3 and the Package exercise, respectively. Note that for Age we were able to estimate MXL models for all subgroups; for Gender and SEG, MXL models did not converge for some of the subgroups and lower level exercises. For consistency, we estimated conditional logit (CL) models instead. Finally, we estimated MXL models for the Package DCE across all subgroups. These results are used in the same way as core models to derive SQ to +1 WTP values for each segment.

Table 19. Exercise 1 DCE Estimates by Segment

	Gender		SEG				Age		
Service measure	**Male (N=265)**	**Female (N=233)**	**A/B (N=287)**	**C1 (N=88)**	**C2 (N=56)**	**D/E (N=55)**	**18-34 (N=127)**	**35-54 (N=178)**	**55+ (N=155)**
Unexpected supply interruptions (3+ hours)	-6.07E-05**	-1.14E-04***	-6.27E-05*	-1.53E-04***	-5.68E-05	-8.69E-05*	-1.59E-04*	-1.43E-04***	-1.29E-04***
Planned supply interruptions (3+ hours)	6.58E-06	-1.49E-05**	6.91E-09	4.93E-07	-1.07E-05	-9.76E-06	-1.81E-05	-4.13E-06	2.39E-06
Long term outage – chance of being without water (12 hrs to 2 weeks)	-2.68E-03***	-4.24E-03***	-2.57E-03**	-3.45E-03***	-5.28E-03***	-3.37E-03**	-4.88E-03*	-4.48E-03***	-5.19E-03***
Discolouration (few hours)	-3.61E-05	3.56E-05	-6.35E-05	6.76E-05*	-5.35E-05	2.21E-05	-1.62E-04*	-2.90E-05	4.59E-05
Taste and odour (few days)	-3.70E-04***	-2.84E-04**	-1.94E-04	-2.27E-04	-6.02E-04***	-4.45E-04*	-0.000512	-5.39E-04**	-1.76E-04
Positive bill change	-2.66E-02***	-2.69E-02***	-2.36E-02***	-2.13E-02***	-2.86E-02***	-3.56E-02***	-3.78E-02***	-4.37E-02***	-2.76E-02***
Observations	1325	1165	1435	440	280	275	635	890	775
LL	-748.573	-756.026	-454.863	-423.390	-296.987	-290.446	-218.882	-462.297	-674.246
Pseudo R2	0.115	0.141	0.099	0.105	0.147	0.190	0.141	0.132	0.106

Model = Mixed Logit for Age and Conditional Logit for SEG and Gender; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 20. Exercise 2 DCE Estimates by Segment

	Gender		SEG				Age		
Service measure	**Male (N=265)**	**Female (N=233)**	**A/B (N=287)**	**C1 (N=88)**	**C2 (N=56)**	**D/E (N=55)**	**18-34 (N=127)**	**35-54 (N=178)**	**55+ (N=155)**
Temporary use ban (May to September)	-1.05E+01*	-5.19E+00	-3.19E+00	3.96E+00	-3.87E+01***	-6.74E+00	-4.05E+01*	-2.08E+01*	2.66E+00
Water leakage	-1.75E-02	4.94E-04	-1.54E-02	-1.63E-02	-1.90E-02	2.62E-02	-2.52E-02	3.69E-02	-5.57E-02
Pipe bursts	-4.78E-04**	-6.02E-04***	-5.51E-04*	-2.32E-04	-1.10E-03***	-7.68E-04**	-2.95E-04	2.71E-05	-1.07E-03***
Sewer flooding inside property	-5.89E-03***	-7.60E-03***	-8.12E-03***	-7.45E-03***	-6.90E-03*	-3.39E-03	-2.71E-03	-2.06E-02***	-5.33E-03*
Sewer flooding in gardens/close to other properties	-3.93E-04***	-4.81E-04***	-4.57E-04***	-4.56E-04***	-3.58E-04**	-4.49E-04***	-7.88E-04***	-5.36E-04***	-4.46E-04***
Positive bill change	-3.36E-02***	-3.13E-02***	-3.09E-02***	-3.39E-02***	-3.49E-02***	-3.13E-02***	-4.83E-02***	-5.14E-02***	-3.11E-02***
Observations	1325	1165	1435	440	280	275	635	890	775
LL	-707.451	-748.158	-427.354	-394.316	-280.859	-306.672	-201.207	-426.178	-672.516
Pseudo R2	0.164	0.150	0.153	0.166	0.193	0.145	0.210	0.233	0.100

Model = Mixed Logit for Age and Conditional Logit for SEG and Gender; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 21. Exercise 3 DCE Estimates by Segment

Service measure	Gender		SEG				Age		
	Male (N=265)	Female (N=233)	A/B (N=287)	C1 (N=88)	C2 (N=56)	D/E (N=55)	18-34 (N=127)	35-54 (N=178)	55+ (N=155)
Pollution Incidents	-5.01E-03	-7.33E-03**	-6.10E-04	-1.19E-02**	-3.29E-03	-7.96E-03	-1.88E-02*	-1.76E-02**	-5.08E-03
River miles of 'less than good' quality (out of total of 2429 miles)	-7.35E-04***	-7.75E-04***	-9.33E-04***	-8.46E-04***	-4.23E-04**	-8.16E-04***	-1.39E-03***	-9.75E-04***	-1.12E-03***
Bathing waters of 'less than good quality'	-4.27E-02*	-4.46E-03	-4.05E-02	-5.29E-02*	3.46E-02	-1.30E-02	-5.11E-02	-5.84E-02*	-3.03E-02
Positive bill change	-2.07E-02***	-2.44E-02***	-2.13E-02***	-2.16E-02***	-1.64E-02***	-2.99E-02***	-2.66E-02***	-4.02E-02***	-2.27E-02***
Observations	1325	1165	1435	440	280	275	635	890	775
LL	-795.093	-811.633	-469.312	-436.557	-334.214	-319.941	-242.733	-529.250	-710.037
Pseudo R2	0.060	0.078	0.070	0.077	0.040	0.108	0.065	0.069	0.073

Model = Mixed Logit for Age and Conditional Logit for SEG and Gender; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 22. Package DCE Estimates by Segment

Service measure	Gender		SEG				Age		
	Male (N=265)	Female (N=233)	A/B (N=287)	C1 (N=88)	C2 (N=56)	D/E (N=55)	18-34 (N=127)	35-54 (N=178)	55+ (N=155)
Lower level exercise 1	2.92E-01**	5.20E-01***	5.47E-01***	4.22E-01**	3.18E-01*	5.48E-01***	4.10E-01*	2.57E-01*	5.35E-01***
Lower level exercise 2	2.35E-01*	2.87E-01***	2.40E-01	3.64E-01*	2.49E-01*	3.34E-01**	2.83E-01	2.38E-01*	2.92E-01***
Lower level exercise 3	7.67E-01***	6.42E-01***	1.12E+00***	9.06E-01***	6.47E-01***	5.42E-01**	1.02E+00***	6.11E-01***	7.28E-01***
Positive bill change	-2.60E-02***	-2.48E-02***	-3.04E-02***	-2.70E-02***	-2.28E-02***	-2.47E-02***	-2.56E-02***	-2.12E-02***	-2.63E-02***
Observations	1325	1165	1435	440	280	275	635	890	775
LL	-642.380	-696.103	-374.513	-355.255	-282.656	-276.304	-204.438	-459.507	-581.949
Pseudo R2	0.193	0.148	0.171	0.172	0.155	0.194	0.166	0.140	0.177

Model = Mixed Logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; * significant at 10%; ** significant at 5%; *** significant at 1%.

Sensitivity analysis

The sensitivity analysis consisted of re-estimating the lower level and package models on the subset of respondents who reported that they felt they were able to make comparisons in the DCE tasks.

Table 23: Exercise 1 DCE Estimates for Respondents Who Felt Able to Make Comparisons

Variable	Unit	Mean		Std. dev.	
Unexpected supply interruptions (3+ hours)	Properties	-0.00011		0.00020	
		(0.00002)	***	(0.00005)	***
Planned supply interruptions (3+ hours)	Properties	-0.00001		0.00006	
		(0.00001)	*	(0.00001)	***
Long term outage – chance of being without water (12 hrs to 2 weeks)	Properties	-0.00488		0.00465	
		(0.00067)	***	(0.00140)	***
Discolouration (few hours)	Properties	-0.00006		0.00039	
		(0.00003)	**	(0.00005)	***
Taste and odour (few days)	Properties	-0.00040		0.00003	
		(0.00010)	***	(0.00022)	
Positive bill change	£/hh/yr	-0.03515			
		(0.00245)	***		
Observations		1980			
LL		-1472.66			
Pseudo R2		0.138			

*Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 24: Exercise 2 DCE Estimates for Respondents Who Felt Able to Make Comparisons

Variable	Unit	Mean		Std. dev.	
Temporary use ban (May to September)	Chance	-16.27223		65.93655	
		(5.97330)	***	(12.15799)	***
Water leakage	%	-0.01712		0.08979	
		(0.02809)		(0.14860)	
Pipe bursts	Nr. of bursts	-0.00085		0.00203	
		(0.00020)	***	(0.00039)	***
Sewer flooding inside property	Nr. of properties	-0.01098		0.02670	
		(0.00207)	***	(0.00312)	***
Sewer flooding in gardens/close to other properties	Nr. of properties	-0.00061		0.00024	
		(0.00008)	***	(0.00029)	
Positive bill change	£/hh/yr	-0.04017			
		(0.00282)	***		
Observations		1980			
LL		-1412.614			
Pseudo R2		0.173			

*Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 25: Exercise 3 DCE Estimates for Respondents Who Felt Able to Make Comparisons

Variable	Unit	Mean		Std. dev.	
Pollution incidents	Cat. 1/2/3 incidents/year	-0.01408		0.03273	
		(0.00302)	***	(0.00454)	***
River miles of 'less than good' quality (out of total of 2429 miles)	Miles	-0.00121		0.00191	
		(0.00013)	***	(0.00018)	***
Bathing waters of 'less than good quality'	%	-0.03461		0.00202	
		(0.01519)	**	(0.05343)	
Positive bill change	£/hh/yr	-0.02870			
		(0.00235)	***		
Observations		1980			
LL		-1526.337			
Pseudo R2		0.107			

*Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 26: Package DCE Estimates for Respondents Who Felt Able to Make Comparisons

Variable	Unit	Mean		Std. dev.	
Lower level exercise 1		0.46834		0.14839	
		(0.06782)	***	(0.34569)	
Lower level exercise 2		0.26526		0.72942	
		(0.06978)	***	(0.11755)	***
Lower level exercise 3		0.90573		1.64388	
		(0.10310)	***	(0.12580)	***
Positive bill change	£/hh/yr	-0.02376			
		(0.00152)	***		
Observations		1980			
LL		-1526.337			
Pseudo R2		0.107			

*Model = Mixed logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Sensitivity to bill attitudes

To gauge the effects of bill attitudes on WTP, we created a dummy variable that equaled 1 if respondents thought the amount they paid for their water and wastewater services was 'slightly too much' or 'far too much', and 0 if 'about right', 'slightly too little' or 'far too little'. This indicator variable was then interacted with each of service measures in the lower level exercises and the service block indicators in the Package exercise to capture the change in (dis)utilities as a result of bill attitudes. In line with the core models, -1 to +2 WTP values for the 'Too little/About right' group were derived as follows from the Package exercise for each service block:

$$WTP_i \ (£/hh/year) = -\frac{\beta_i}{\beta_{positive}}$$

while for the 'Too much' group, these values were derived as follows:

$$WTP_i \ (\text{£}/hh/year) = -\frac{\beta_i + \beta_{i \times too \ much}}{\beta_{positive}}$$

where *i* denotes the service block.

In a similar vein, the group-specific coefficients in the lower level exercises would be β_i for 'Too little/about right' group, and $\beta_i + \beta_{i \times too \ much}$ for the 'Too much' group, with *I* now denoting a service measure. These group-specific coefficients can then be used along with the group-specific WTP values from the Package exercise to derive SQ to +1 service measure values following the method highlighted above.

The model estimates are presented in Table 27,
Table 28, Table 29, and Table 30 for Exercises 1, 2 and 3 and the Package exercise, respectively. Results show that respondents who think they are paying too much for their water service often prefer less (and are therefore WTP less for) improvements in service measures. This is significantly the case with planned interruptions and long term outage in exercise 1, internal sewer flooding in exercise 2 and pollution incidents in exercise 3. Note however that none of the bill attitude interaction terms were significant in the Package exercise. Finally, we note that for temporary use ban in exercise 2 and bathing water quality in exercise 3, respondents thinking that they are paying too much by way of water and wastewater bills have negative and significant bill attitude interaction terms. This indicates that for these two attributes, 'Too much' respondents are WTP more for improvement these service measures.

Table 27: Exercise 1 DCE Estimates with Bill Attitude Interaction

Variable	Unit	Mean	
Unexpected supply interruptions (3+ hours)	Properties	-0.00014	
		(0.00003)	***
Planned supply interruptions (3+ hours)	Properties	-0.00002	
		(0.00001)	**
Long term outage (12 hrs to 2 weeks)	Properties	-0.00599	
		(0.00086)	***
Discolouration (few hours)	Properties	-0.00005	
		(0.00004)	
Taste and odour (few days)	Properties	-0.00049	
		(0.00012)	***
Unexpected supply interruptions (3+ hours) x Too Much	Properties	0.00004	
		(0.00004)	
Planned supply interruptions (3+ hours) x Too Much	Properties	0.00002	
		(0.00001)	**
Long term outage (12 hrs to 2 weeks) x Too Much	Properties	0.00308	
		(0.00121)	**
Discolouration (few hours) x Too Much	Properties	0.00006	
		(0.00006)	
Taste and odour (few days) x Too Much	Properties	0.00020	
		(0.00018)	
Positive bill change	£/hh/yr	-0.03388	
		(0.00224)	***
Observations		2555	
LL		-1522.201	
Pseudo R2		0.140	

*Model = Mixed logit with interaction terms and bill treated as fixed; standard deviation estimates not reported; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 28: Exercise 2 DCE Estimates with Bill Attitude Interaction

Variable	Unit	Mean	
Temporary use ban (May to September)	Chance	5.34549	
		(7.10081)	
Water leakage	%	0.00288	
		(0.03612)	
Pipe bursts	Nr. of bursts	-0.00086	
		(0.00023)	***
Sewer flooding inside property	Nr. of properties	-0.01402	
		(0.00246)	***
Sewer flooding in gardens/close to other properties	Nr. of properties	-0.00065	
		(0.00009)	***
Temporary use ban (May to September) x Too Much	Chance	-31.64377	
		(10.49452)	***
Water leakage x Too Much	%	-0.05579	
		(0.05156)	
Pipe bursts x Too Much	Nr. of bursts	0.00032	
		(0.00034)	
Sewer flooding inside property x Too Much	Nr. of properties	0.01049	
		(0.00345)	***
Sewer flooding in gardens/close to other properties x Too Much	Nr. of properties	0.00018	
		(0.00012)	
Positive bill change	£/hh/yr	-0.04060	
		(0.00246)	***
Observations		2555	
LL		-1443.700	
Pseudo R2		0.185	

Model = Mixed logit with interaction terms and bill treated as fixed; standard deviation estimates not reported; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 29: Exercise 3 DCE Estimates with Bill Attitude Interaction

Variable	Unit	Mean	
Pollution Incidents	Nr. Cat. 1/2/3 incidents/year	-0.01669	
		(0.00376)	***
River miles of 'less than good' quality	Miles	-0.00124	
		(0.00017)	***
Bathing waters of 'less than good quality'	%	-0.01855	
		(0.02001)	
Pollution Incidents x Too Much	Nr. Cat. 1/2/3 incidents/year	0.01668	
		(0.00527)	***
River miles of 'less than good' quality x Too Much	Miles	0.00034	
		(0.00023)	
Bathing waters of 'less than good quality' x Too Much	%	-0.05670	
		(0.02861)	**
Positive bill change	£/hh/yr	-0.02883	
		(0.00226)	***
Observations		2555	
LL		-1584.080	
Pseudo R2		0.106	

Model = Mixed logit with interaction terms and bill treated as fixed; standard deviation estimates not reported; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 30: Package DCE Estimates with Bill Attitude Interaction

Variable	Unit	Mean	
Lower Level exercise 1		0.41298	
		(0.08527)	***
Lower Level exercise 2		0.25717	
		(0.08591)	***
Lower Level exercise 3		0.79359	
		(0.02213)	***
Lower Level exercise 1 x Too Much		0.01485	
		(0.12158)	
Lower Level exercise 2 x Too Much		-0.00282	
		(0.12312)	
Lower Level exercise 3 x Too Much		-0.16293	
		(0.17108)	
Positive bill change	£/hh/yr	-0.02527	
		(0.00144)	***
Observations		2555	
LL		-1371.870	
Pseudo R2		0.225	

*Model = Mixed logit with interaction terms and bill treated as fixed; standard deviation estimates not reported; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; estimates all based on weighted data; standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Wessex Water
Further Willingness to Pay Research
Final Report
November 2017

Review by

Ken Willis,
Newcastle University

20th July 2018

Comments
The objective of the research by Accent & PJM Economics was to understand and estimate customers' preferences and willingness-to-pay (WTP) for water and waste water service improvements; which Wessex Water (WW) could use to formulate their PR19 business plan.

Survey Design
The questionnaire survey uses a discrete choice experiment (DCE), designed to estimate household customers' values for water and sewerage service measure changes. The research by Accent & PJM Economics follows well established and proven DCE methodology, employed by many water companies in PR09, PR14 and PR18.

It is commendable that Accent & PJM Economics have used a combined package DCE, where water and sewerage service measures are combined into one single survey instrument, rather than being estimated in separate surveys by service area. This will eliminate part-whole bias and any over-estimation of benefits, which almost certainly would have occurred if service areas had been independently valued in separate DCEs.

The survey instrument describes each service measure simply and unambiguously, which respondents can clearly understand. Each service measure was also expressed in quantitative terms, e.g. the number and percentage of properties affected, so that respondents were provided with context in which to judge both the severity of the service failure and probability of failure.

Accent & PJM Economics rightly split the service measures into three blocks (water supply and quality to the home; water supply outside the home and sewer flooding; and the environment – river and bathing water quality) each with 3 to 5 attributes or service measures. The limited number of service measures in each block allows respondents to simultaneously consider all the service measures in the block, and trade these off against each other; without the need to adopt some simplifying heuristic. With more service measures, there is a danger that respondents do not consider all the attributes, but ignore some attributes through adopting a simplifying heuristic.

The Report does not explain why a bill change was attached to each of the three DCEs. It does not appear to have been used to establish money values for service measure changes. Values for service measures were derived from the utility attached to each service measure estimated in the three DCEs, and the value for each service measure block derived from the package DCE (page 49 of the Report).

Each respondent answered 5 choice cards from each DCE: the two water supply DCEs and the environment DCE, plus the package DCE. This provided a sufficient number of observations without encountering respondent fatigue.

Pilot survey

Prior to the main survey, a pilot survey, comprising 87 customers, was undertaken. The pilot survey closely matched the main survey in design. Respondent feedback on the questionnaire was positive, and the econometric models worked well, with expected signs for most of the service measure coefficients. The encouraging results for the pilot survey, suggested the main survey could proceed.

Survey administration

The main survey comprised 511 online interviews. This is a sufficiently large sample to provide models with an acceptable goodness-of-fit to the data, and statistically significant coefficients for each of the service measures. The overall response rate was only 7% (511/7750) of these emailed. Online surveys typically have lower response rates than one-to-one interviews. Normally survey response rates are not reported by other water companies, but there is no reason to suspect that this rate is any different from others using an online survey.

The issue with non-response is that it could give rise to a biased sample, e.g. because some respondents are more enthusiastic than others about the survey instrument (e.g. the young relative to old people). And indeed, the survey responses did not closely reflect the population characteristics in the WW area, with over-sampling of SEGs AB relative to C1, C2 and DE; and over-sampling of the younger age group (18-34) relative to the older age group (55+). However, Accent & PJM Economics were able to successfully address this issue by weighting the sample to correct for these biases.

Econometric models

Econometric models can be judged in terms of the appropriateness of the model, the goodness-of-fit of the model, and the sign and statistical significance of the coefficients of each attribute or service measure.

PJM Economics rightly uses a mixed logit model, which allows for heterogeneity in customers' preferences, rather than a conventional conditional logit model which assumes homogeneity in preference for each service measure across customers.

The goodness-of-fit of the models for each of the DCEs is good. Exercise 1 (water supply and quality to the home), exercise 2 (water supply to area and sewerage) and the package DCE,

all have pseudo R^2 values over 0.12 (a pseudo R^2 value of 0.12 is usually judged a good fit). DCE exercise 3 (the environment) has a pseudo R^2 value = 0.101. This is acceptable. Some DCE for other water companies have reported and used models with pseudo R^2 values much lower than this, to estimate WTP values. The goodness-of-fit for the package DCE is a particularly good, with pseudo R^2 =0.225.

The signs on the coefficients are also correct (e.g. customer would like to see fewer properties subject to unexpected supply interruptions: Table 13); and all of the coefficients are highly statistically significant, with the exception of three coefficients: planned supply interruptions, and discolouration (Table 13), and water leakage (Table 14).

It is quite probable that customers perceived water leakage and pipe bursts to be correlated, i.e. partly substitutable. So some of the effect of water leakage may have been transferred to pipe bursts. This is exemplified in Table 16 for utility change and service measure weights, where the service measure weight for pipe bursts (20.5%) is almost 5 times that for water leakage (4.4%).

Of course, technically, if coefficients are not statistically significant then it is inappropriate or inadvisable to use them to calculate service measure weights and WTP values for those attributes.

All of the attributes in the package DCE (Table 17) have the right signs (customers would like to see improvements, but would prefer lower bill amounts), and are statistically significant.

Main valuation results
The WTP results have been expertly and correctly estimated. The WTP values also appear to be intuitively reasonable.

Economic theory of declining marginal utility predicts that the utility or value of successive increments of a good will decline. So the fact that the value for the package improvement +1 to +2 is greater than the value of the improvement SQ to +1, might appear at first sight to be anomalous. Accent & PJM Economics rightly point out that the absolute service improvements of the former are substantially larger than the latter, and this accounts for the apparent anomaly. However, in only 7 of the 13 service measures are the +1 to +2 unit improvements greater than the SQ to +1 unit improvements.

The Report (page 23) mentions a key finding from the econometric analysis that "respondents appear to be opposed to bill reductions" and "bill reductions would not be valued by customers, and as such, service deteriorations would also not be desired on average, regardless of the size of the bill reduction that could be achieved". This is a very strong statement, especially in light of customers' attitude to their water bills, where around 14% thought their bill was "far too much" (Figure 7), and around 34% thought their bill was "slightly too much" (Figure 7).

The WTP values for service measures (Table 9) are estimates for WW household customers with water and waste water services. Table 9 also sensibly includes the lower and upper bounds of the WTP values, as well as the mean WTP value. The lower bound value can be used as a sensitivity test in a cost-benefit analysis of a project to improve the service measure.

The Report also mentions that these unit values for service measures can be "assumed for non-households who were not covered by this research" (pages 25 & 26). Can this extrapolation be really justified for non-household customers across all service measures? Sometimes non-household customers have expressed different WTP values compared to household customers, for some service measures.

Apart from these three comments, I believe the DCE analysis and WTP estimations are an excellent and professional piece of evaluation. The results can be used with confidence in appraising a business plan for future investment.

Validity

Accent & PJM Economics also undertake some validity testing. Content validity (the appropriate framing of the study and questions asked) appears to have been satisfied. The questionnaire was thoroughly tested in a pilot survey. And in the main survey most of respondents found the descriptions of service measures easy to understand; and were able to make comparisons between the options presented (Table 7). Moreover, few respondents thought any on the service levels to be implausible.

Legitimacy of the results can also be assed in terms of construct validity, in particular theoretical validity. The DCE models all worked well, and conformed to theoretical expectations. Accent & PJM Economics also investigated whether the WTP values were sensitive across customers by socio-economic groups (SEG) (as a proxy for income), age characteristics of respondents, and attitude to their water bill amount. Analysis revealed some sensitivity of values for respondents who thought their water bills were too high. Support for the validity of the WTP values was also derived from the analysis by SEG, where values tended to be lower for C2 and DE groups relative to AB and C1 groups. However, as sample sizes become smaller, inevitably standard deviations become relatively higher, when the data is divided into SEG segments; resulting in fewer and less reliable results.

The fact that the study satisfies these two aspects of validity (content and construct), engenders confidence in the results derived by Accent & PJM Economics.

Conclusion

The research by Accent & PJM Economics in terms of methodological approach, pilot survey, main survey, and econometric analysis of the data is commendable. WW can be assured that the main survey has been meticulously and skilfully implemented. WW can also be confident that the main survey worked well; and delivered accurate, reliable, and robust estimates of customers' preferences and WTP values for water service improvements.